THE USE AND TAILORING OF AN EVIDENCE-BASED PHYSICAL ACTIVITY BEHAVIOR CHANGE PROGRAM IN A UNIQUE WORKSITE POPULATION

BY

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DISSERTATION

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ABSTRACT

Rates of overweight and obesity have risen drastically in the United States in the last thirty years. As a result of the overweight and obesity epidemic, health care costs in the United States have also grown exponentially. Often, employers have to bear the brunt of these rising health care costs along with the side effects of overweight and obesity, including increased presenteeism, absenteeism, and lack of productivity. An excellent intervention for the growing overweight and obesity epidemic is worksite wellness programs, a relatively recent trend in the field of health education.

This study assessed the effects of an evidence-based physical activity behavior change program on mass transit employees. The evidence-based behavior change program, Active Living Every Day, was originally designed as a 20-week curriculum. This study condensed the program into a 6-week format. This study was delivered in two phases. The first phase received the 6-week version of the program in its original format, without any tailoring. The second phase received a 6-week version of the program, which was tailored to meet the needs of the mass transit population. Tailoring of the program was done using focus groups after the conclusion of Phase 1 of the intervention, using the Nominal Group Technique. Phase 1 (n = 7) occurred from mid-October 2010 to December 2010. The focus group was held in December 2010. The ALED program was facilitated by a trained ALED facilitator and was held at the worksite for employees' convenience.

Phase 1 participants had a mean age of 47.6 ± 9 years, with a range of 35-58 years. Average BMI was 32.5 ± 8.9, with a range of 17.8-44.3. Phase 2 (n = 19) occurred from mid-January 2011 to February 2011. The follow-up focus group occurred in February 2011. Phase 2 participants had a mean age of 46.6 ± 11.7 years, with a range of 27-72 years. Average BMI

was 32.1±1.9, with a range of 21.6 to 53.7. The study assessed the effects of the non-tailored and tailored version of the intervention on participants' physical activity levels, barriers to physical activity, stages of change, self-efficacy, processes of change, sleep quality, stress, fatigue, overall health status, functionality, participants' feelings toward physical activity, and physical activity enjoyment. Outcome measures were collected at baseline and post-intervention. In Phase 1, statistically significant changes were seen in caring about consequences to others ($p = 0.05$), increasing healthy opportunities ($p = 0.007$), committing oneself ($p = 0.005$), and reminding oneself ($p = 0.04$). These factors were all part of the processes of change. For Phase 2, statistically significant changes were seen in decisional balance ($p = 0.029$), increasing healthy opportunities ($p = 0.006$), substituting alternatives ($p = 0.017$), rewarding oneself ($p = 0.041$), reminding oneself ($p = 0.034$), sleep quality ($p = 0.004$), physical activity affect ($p = 0.001$), physical activity enjoyment ($p = 0.001$), perceived stress ($p = 0.004$), reduced motivation ($p = 0.24$), and overall physical and mental health ($p = 0.02$). Comparing the non-tailored version of ALED to the tailored version, statistically significant changes were exhibited in two measures: increasing healthy opportunities ($p = 0.013$) and physical fatigue ($p = 0.002$).

It is inconclusive to determine whether tailoring the ALED intervention had any significant impacts on the outcome measures. The ALED intervention, however, is a relatively inexpensive and easy to implement worksite wellness program and did demonstrate significant changes in participants' processes of change, sleep quality, perceived stress, fatigue, physical activity enjoyment, and overall physical and mental health status. One explanation for the lack of significance from non-tailored to tailored versions may be the small sample size in the non-tailored version. Because of this and other factors, more studies need to be completed to determine its effectiveness for the tailored version.

To Mom and Dad

Who sacrificed so much so that I would never go without,
Who taught me, by example, the value of education, hard work, and perseverance,
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CHAPTER 1

INTRODUCTION

A recent trend in the field of health education, worksite wellness programs are excellent interventions for the growing overweight and obesity epidemic. In a 1993 report prepared by the United States Department of Health and Human Services, Office of Disease Prevention and Health Promotion, J. Michael McGinnis, former Deputy Assistant Secretary of Health, wrote, "Worksite health promotion has taken on increasing importance as a contributor to improved health for many Americans. With the expanded activity comes an interest and obligation to assess the results of such programs to ensure that we have a clear notion of what works best in various settings (p. 12)."

Rates of overweight and obesity have risen drastically in the United States in the last 30 years. As a result of the overweight and obesity epidemic, health care costs in the United States have also grown exponentially. The Centers for Disease Control and Prevention (CDC), along with its Healthy People in Healthy Places health promotion campaign, has drawn the analogy that workplaces are to adults what schools are to children since the majority of adults over the age of 18 spend a significant portion of time at their workplaces (United States Department of Health and Human Services, 2000). Five out of the six leading causes of death in the United States in 2002 were attributable to a chronic disease (Centers for Disease Control and Prevention [CDC], 2008a). The majority of these deaths were due to physical inactivity and poor nutrition, which are also contributors to the growing overweight and obesity epidemic.

The development of worksite wellness programs is a relatively recent phenomenon in the field of health education and occupational health. Early worksite wellness programs emphasized worker safety, such as the use of personal protective equipment and proper use of machinery.

Recent worksite wellness programs, however, also incorporate physical activity, nutrition, and smoking-cessation interventions. Worksite wellness programs have the ability to impact the health of many Americans because a large proportion of the American population is in the workforce. Implementation of worksite wellness programs in worksites can result in lower rates of illness and chronic disease, leading to lower health care costs (Pronk, Goodman, O'Connor, & Martinson, 1999).

Significance of the Study

The significance of this study is that it is the first to use Active Living Every Day (ALED) in a 6-week format with mass transit employees. ALED's usual delivery timeline is a 20-week format. ALED has been used successfully with older adult populations (Hildebrand & Neufeld, 2009) and with individuals with arthritis (Callahan, Schoster, Hootman, Brady, Sally, et al., 2007). Also, ALED has been used with other worksite wellness populations (Troxell, Johnston, Hornsby, Laymon, & Massey, 2009), but has never been used with a mass transit population. In addition, this study will determine whether tailoring the program's curriculum to meet the needs and wants of the mass transit workforce will affect employees' levels of stress, fatigue, and on-the-job satisfaction versus a program that was not tailored.

Purpose of the Study

The purpose of this study is to determine the effect of a worksite-based physical activity program on reducing sedentary time in a unique population, transit workers. There are three primary aims of the study. The first primary aim of the study is to examine the impact of an existing, evidence-based physical activity behavior change program in creating changes in physical activity behaviors and therefore improving health status of Champaign-Urbana Mass Transit District (CUMTD) employees, including fatigue and stress indicators. The second

primary aim of the research study is to develop a framework to be used to tailor interventions for the worksite setting. The third primary aim of the study is to determine the worksite's specific needs for implementation of a worksite wellness program by developing a logic model.

CHAPTER 2

LITERATURE REVIEW

Scope of the Literature

The literature review focuses on literature from 1980 through the present, reflective of the era when worksite wellness programs that incorporated physical activity and nutrition interventions were first gaining popularity. The majority of the reviewed literature is from online resources, electronic journals, and databases, including Pubmed and Medline. For this literature review, the inclusion criteria for articles were (a) publication in the English language, (b) publication between 1980 and the present, (c) focus on intervention conducted in the worksite setting, (d) inclusion of an intervention with a physical activity component or nutrition component or both, (e) inclusion of an intervention whose participants were 18 years or older, (f) inclusion of a study with at least 5 participations, (g) inclusion of a study with participants who were at least part-time employees (defined as 20 hours or more per week) of the organization, and (h) inclusion of an intervention that was longer than 4 weeks.

Possible Biases and Areas Needing Additional Attention

Several possible biases occurred in my literature search. First, only articles published in English were used. Some of the initial studies on worksite wellness were conducted in Finland and Sweden and published in their respective languages. Since I am not literate in those languages, I was unable to use those articles. Finally, only articles published in electronic databases were used.

Organization of the Review

The first section of the literature review discusses the overweight and obesity epidemic plaguing American children and adults. The next section discusses the current physical activity

recommendations for Americans and the effects of physical activity on health. The third section provides an overview of the effects of overweight and obesity on employers and employees. The fourth discusses the background of worksite wellness programs. The final section discusses evaluation theories and public health evaluation.

Literature Review

Overweight and Obesity Epidemic

The prevalence of overweight and obesity is increasing at alarmingly fast rates in the United States. Overweight is defined as having a body mass index, or BMI, between 25.0 and 29.9 whereas obesity is defined as having a BMI greater than 30.0 (CDC, 2008a). Individuals who are classified as morbidly obese have a BMI larger than 40.0. The lack of regular physical activity combined with poor dietary choices have resulted in an overweight and obesity epidemic in the United States.

As the literature demonstrates, the prevalence of overweight and obesity in the United States is increasing at exponential rates. The National Health and Nutrition Examination Study (NHANES) survey demonstrates this peaked increase. The 1976-1980 NHANES survey reported adults aged 18–74 years had a prevalence of obesity of 15.0% while the 2003-2004 survey revealed an obesity prevalence of 32.9%. Prevalence of obesity increased from 22.9% in 1988 to 30.0% in 1999 (Flegal, Carroll, Ogden, & Johnson, 2002). In 2005-2006, 34% of American adults were considered obese (CDC, 2008b). As reported by Ogden et al. (2006), 69% of American adults are classified as being either overweight or obese.

As with many public health issues, the problems of overweight and obesity are also affected by health disparities. Although all Americans are at risk of being affected by the overweight and obesity epidemic, not everyone is equally at risk due to health disparities. One

such health disparity is one's race and ethnicity. African-Americans and Hispanics, for example, generally have higher rates of overweight and obesity when compared to Caucasians. Hedley et al. also revealed that overweight and obesity rates are highest among African-American and Mexican-American females, 77.2% and 71.7%, respectively. Native American and Mexican-American males also have high rates of overweight and obesity with rates of 76.6% and 73.1%, respectively.

Economic disparities also play a role in the overweight and obesity epidemic. Lower incomes have been associated with a higher rate of obesity in some groups. Women who have an income that is at or below 130% of the poverty threshold are 50% more likely to be obese compared to women who have an income greater than 130% of the poverty threshold (United States Department of Health and Human Services, 2000). Results from NHANES reveal that non-Hispanic white adolescents from lower-income families have higher rates of overweight as opposed to adolescents from higher-income families (Troiano & Flegal, 1998). Economic disparities can also cause disparities in access to healthy foods along with access to physical activity programs and facilities. Drewnoski and Specter (2004) found that healthy foods cost more than less healthy, calorie-dense foods. In addition, a study that surveyed over 200 neighborhoods revealed that there were three times as many supermarkets in wealthy neighborhoods as in poor neighborhoods (Morland et al., 2002). Involvement in physical activity is also affected by individuals' economic status. Powel, Slater, and Chaloupka (2004) demonstrated that a move from a high-poverty area to a low-poverty one resulted in a 50% increase in availability of outdoor places, such as parks, to play and participate in physical activity.

Physical Activity and Health: A Report of the Surgeon General (1996) reveals that physical inactivity and obesity, which are modifiable health risks, are related to morbidity and mortality. Obesity is the seventh leading cause of death in the United States according to the CDC (2005). Wyatt, Winters, and Dubbert (2006) present evidence that being overweight or obese can decrease the mean lifespan by as much as five years. According to Fontaine, Redden, Wang, Westfall, and Allison (2003), adults whose BMI is greater than 45 also average a decreased lifespan by 20 years. Regardless of initial body weight, weight gain during adulthood increases the risk of developing a chronic disease (Visscher & Seidell, 2001). The same reports states that the average American adults gains approximately one to two pounds per year. Because of the burgeoning overweight and obesity problem, effective population-based interventions are desperately needed to slow, if not reduce, the overweight and obesity epidemic (Nanchahal, Morris, Sullivan, Wilson, 2005).

According to *Physical Activity and Health: A Report of the Surgeon General* (1996), overweight and obesity are tied to a myriad of health problems. Being overweight or obese can significantly increase an individual's chances of developing cardiovascular disease (CVD). CVD can result in health problems such as coronary heart disease, heart attack, and stroke, among other problems related to the body's heart and blood system. Having a large BMI can also raise blood cholesterol and triglyceride levels, which can lead to cardiovascular disease. Overweight and obesity can lower one's high-density lipoprotein (HDL), or "good" cholesterol, while increasing low-density lipoprotein (LDL), or "bad" cholesterol. Other diseases associated with high BMI levels include cancer (e.g. breast, colorectal, endometrial), end-stage renal disease, obstructive sleep apnea, arthritis, and type two diabetes. In addition, obesity has been

associated with mental and social issues, including depression (Carpenter, Hasin, Allison, & Faith, 2000) and discrimination (Thomas, Hyde, Karunarathe, Herbert, et al, 2008)

Physical Activity and Health

According to Pate, Pratt, Blair, Haskell, Macera, Bouchard, et al. (1995), sedentary lifestyles have become a way of life and only the minority of the population fulfills the recommended guidelines of physical activity. According to the CDC (2008a), in 2007, over half of American adults did not achieve the recommended amount of daily physical activity. Nearly a quarter of the population reported no leisure-time physical activity. Physical inactivity increases as people age and is more prevalent among women than men. Adults with lower incomes and less education are less physically active than their counterparts with higher incomes and more education. Over 50% of young Americans between the ages of 12 and 21 do not engage in vigorous-intensity physical activity on a regular basis. During adolescence, physical activity levels significantly decline with age.

Physical Activity and Health: A Report of the Surgeon General (1996) demonstrates the strong correlation between physical activity and health. The report compiles the major findings about physical activity and health from decades of research. Some of the key findings from the report were the following:

1. Inactive adults have the ability to improve their health by becoming moderately active on a consistent basis.
2. Physical activity does not have to be strenuous for health benefits to be achieved.
3. Individuals can achieve more health benefits by increasing the duration, frequency, or intensity of physical activity.

Physical Activity and Health: A Report of the Surgeon General (1996) discusses the benefits of regular, moderate-intensity physical activity done on five or more days for the week. Regular physical activity helps in reducing the risk of developing or dying from certain types of chronic diseases, such as cardiovascular diseases or type 2 diabetes. Additional benefits of regular physical activity include: (a) reduction in the risk of premature death; (b) reduction in the risk of developing or dying from cardiovascular disease; (c) reduction in the risk of developing or dying from type II diabetes; (d) reduction in the risk of developing hypertension; (e) assistance in hypertension management; (f) assistance in weight management; (g) assistance in healthy bones, muscles, and joints maintenance; (h) assistance in helping older adults in becoming stronger and with fall prevention; and (i) promotion of psychological well-being.

The United States Department of Health and Human Services' publication, *2008 Physical Activity Guidelines for Americans,* summarizes the most recent (1996 – 2007) research findings regarding the health benefits of physical activity:

1. Regular physical activity reduces the risk of many adverse health outcomes.
2. Some physical activity is better than none.
3. For most health outcomes, additional benefits occur as the amount of physical activity increases through high intensity, greater frequency, and/or longer duration. This phenomenon is known as "dose-response."
4. Most health benefits occur with at least 150 minutes a week of moderate-intensity physical activity, such as brisk walking. Additional benefits occur with more physical activity.
5. Both aerobic (endurance) and muscle-strengthening (resistance) physical activity are beneficial.

6. Health benefits occur for children and adolescents, young and middle-aged adults, older adults, and those in every studied racial and ethnic group.

7. The health benefits of physical activity occur for people with disabilities.

8. The benefits of physical activity far outweigh the possibility of adverse outcomes.

The United States Department of Health and Human Services (2008a) also presented new evidence of the relationship between physical activity and health for children, adolescents, and adults. For adults, the findings were similar to the ones from *Physical Activity and Health: A Report of the Surgeon General* (1996). There were, however, some new findings. Researchers found strong evidence that physical activity (a) lowers risk of colon cancer, (b) lowers risk of breast cancer, and (c) results in better cognitive functioning for older adults. There was moderate evidence that physical activity: (a) results in better functional health for older adults; (b) reduces abdominal obesity; (c) lowers risk of hip fractures; (d) lowers risk of lung cancer; (e) lowers risk of endometrial cancer; (f) assists in weight maintenance after weight loss; (g) increases bone density; and (h) improves sleep quality.

The new physical activity guidelines for Americans differ slightly from the previously used guidelines from *Physical Activity and Health: A Report of the Surgeon General* (1996). The previous guidelines, which were created in conjunction with the American College of Sports Medicine and CDC, stated that adults should accumulate at least 30 minutes of moderate-intensity physical activity on most, if not all days of the week. For adults, the new guidelines recommend doing 150 minutes of moderate-intensity aerobic physical activity or 75 minutes of aerobic vigorous-intensity physical activity or any equivalent combination. The aerobic activity should be done in at least 10 minute intervals, done throughout the week, if possible. Also, muscle-strengthening activities should be done at least two days per week. Older adults, 65

years and older, should follow the adult guidelines and do physical activity based on their abilities. Older adults should also participate in activities that encourage balance and coordination. Physical inactivity should be avoided, if possible.

Effects of Overweight and Obesity on the Worksite

As the literature states, there has been overwhelming evidence supporting the link of individual risk factors, such as tobacco and alcohol use, physical inactivity, and poor nutrition, to employer cost variables including medical care, disability, and absenteeism (Anderson et al., 2000; Goetzel et al., 1998; Pronk, Tan, & O'Connor, 1999). As overweight and obesity rates continue to climb, so do health care costs. Burton, Chen, Schultz, and Edington (1999) show that as BMI increases so does the number of sick days, medical claims, and healthcare costs. Obese adults under the age of 65 have annual medical expenses that are 36% higher than individuals with a normal BMI (Strum, 2002). According to *Healthy People 2010*, individuals' lifestyle behaviors are key indicators for morbidity and mortality in the United States. As the incidence of these risk factors increase so does the chances of employees reaching the status of high cost employees (Anderson et al., 2000; Goetzel et al., 1998; Pronk, Tan, & O'Connor, 1999).

Because of the link between lifestyle behaviors and healthcare costs, worksite wellness programs have become a method to introduce behavior change programs that will eventually reduce health risks, employer costs, increase productivity, and improve quality of life (Aldana & Pronk, 2001; Goetzel, Juday, & Ozminkowski, 1999). There are both significant health and financial benefits for keeping low risk employees as low risk and attempting to lower the risk of medium- and high-risk employees (Edington, Yen, & Witting, 1997). In addition, Edington et al. (1997) state that having low-risk employees maintain their low-risk status would prove to be

easier and more cost effective than attempting to change high-risk employees who may lack the motivation, desire, and skills to undergo a lifestyle change. Not only do employees' health behaviors influence the health of the workforce but so do work factors including the company's size, its profitability, and its willingness to embrace new innovation and technology (Lindstrom, 1994).

Employers are taking a very serious look at their employees' health behaviors for a variety of reasons. Approximately 20-30% of employer healthcare costs are attributable to modifiable health risks (Yen, Schultz, Schnueringer, & Edington, 2006). First, employees are often a company's most priceless resource, especially in a knowledge-based economy such as the current one (Thygeson, 2010). Also, employers pay a significant portion of employee healthcare costs (Thygeson, 2010). The current situation has strained resources to provide for health care costs, including private employer-sponsored health insurance coverage (Henry J. Kaiser Foundation, 2004). In 2004, companies had 12% increases on insurance premiums (Hewitt Associates, LLC, 2004). Twenty-four percent of companies intended to raise employee contributions while 30% would raise dependent contributions to cover the increase on insurance premiums (Hewitt Associates, LLC, 2004). Employers, however, continue to suffer the brunt of increasing health care costs as their costs have increased 76% while employees' costs have increased by 12% (Hewitt Associates, LLC, 2004). A study conducted by the Kaiser Family Foundation revealed employer premiums for medical insurance was $3,615 for single coverage and $8,508 for dependant coverage (Henry J. Kaiser Family Foundation, 2006). While the rising health care costs are daunting for any employee and employer, Collins, Davis, Doty, and Ho (2004) report that more than 25% of companies with over 500 employees do not provide employer-based health insurance for their employees and their dependents. Health plans,

however, do have a way to encourage healthy lifestyles among their insured. Four types of methods are encouraged: direct-to-members, provider-mediated, employer-mediated, and community-based programs (Thygeson, 2010). Direct-to member health promotion plans are programs that are directly offered by an insurance company to its members. Examples of these plans include Health Risk Appraisals (HRAs). These programs can be effective since they focus only on individuals who are already part of the plan; however, participation is usually low in these programs. Provider-mediated programs are ones that are implemented by an individual's health care provider, usually one that is associated with a preferred provider organization or health maintenance organization. Provider-mediated programs can greatly influence an individual's health but are often difficult to provide because many providers are not well-prepared to promote healthy lifestyle behaviors. Employer-mediated programs are programs provided by employers to benefit their employees' health status. Employer-mediated programs include worksite health promotion programs. Finally, community-based programs are programs found within a community whose goal is to promote healthy lifestyle choices among the community members. Programs sponsored by community organizations, such as a parks and recreations department, are categorized as community-based programs.

Goetzel et al. (2004) revealed that on-the-job productivity losses, also known as presenteeism, are accountable for between 18% to 64% of total health and productivity related expenditures. According to Wellman and Friedberg (2002), the total economic cost due to obesity was $99 billion in 1995. Of that $99 billion, $51.6 billion was due to direct medical costs, which included physician visits, hospital visits, and medications. The indirect costs, $43.1 billion, included lost productivity and days of lost work.

By 2000, the estimated cost of obesity had jumped to approximately $117 billion (CDC, 2008). In 1995, 5.7% of the United States National Health Expenditures, defined as the costs of Medicare and Medicaid, were attributable to obesity-related issues (Wellman & Friedberg, 2002); in 1998, 9.1% of those expenditures were related to obesity (Wolf & Colditz, 1998). Finkelstein, Fiebelkorn, & Wang (2003) found that overweight- and obesity-related issues constituted 9.1% of the total annual U.S. medical expenditure, which includes costs incurred by Medicare, Medicaid, private insurance, and individuals' own payments outside of insurance. In 2006, the United States health care spending was $2.1 trillion, which represents approximately 16.0% of the gross domestic product, and is expected to reach $4.1 trillion by 2014 (Poisal et al., 2007). Approximately, $92.6 billion was attributable to overweight and obesity related causes (Finkelstein, Fiebelkorn, and Wang, 2003).

Nearly 90% of insurance claims are due to an individual's lifestyle behaviors, including tobacco use, physical inactivity, and poor diet. A 2002 study revealed obese adults have annual medical expenditures that are approximately 36% higher than costs for normal-weight adults (Sturm, 2002). Finkelstein, Fiebelkorn, and Wang (2005) reveal that annual per capita increase in medical expenditures and absenteeism is $176 per year for overweight male employees while grade II obese women (BMI = 35 to 39.9) have an increase of $2,485. From these initial results, Finkelstein, Fiebelkorn, and Wang determined that the costs of obesity, alone, at a company of 1,000 employees can be projected to be approximately $285,000 per year with 30% of these costs attributed to higher rates of absenteeism. The alarming fact is that this figure is reflective of only obese employees and does not include the costs associated with overweight employees. The authors of the study also stated companies with a higher percentage of women or older employees would have higher costs associated with obesity. Individuals with a BMI greater than

40.0 comprised only 3% of the working population; however, these employees were accountable for 21% of the costs of obesity.

The overweight and obese workforce, coupled with increases in cost of health care, can be prohibitive for employers to supply affordable health insurance to its employees. Thompson, Edlesberg, Kinsey, and Oster (1998) demonstrate that employees who are obese have higher absenteeism rates than non-obese employees. The authors revealed that obese male employees were absent up to 2.7 more days per year than normal weight males while obese female employees were absent up to 5.1 more days per year than normal weight females. Not only are some of the costs of overweight and obesity passed on to employees in the form of higher insurance premiums, but employees may also receive lower wages as employers attempt to account for some of the burden of higher medical costs. Due to the exponential rise in rates of overweight and obesity, Finkelstein et al. (2005) state that employers will be forced to decide whether to fund worksite wellness programs, medical and surgical interventions, and disease-management programs.

Background of Worksite Wellness Programs

Goetzel and Ozminkowski (2008) define worksite health promotion programs as "employer initiatives directed at improving the health and well-being of workers, and in some cases, their dependents" (p. 303). The authors (2008) also state worksite health promotion programs "include programs designed to avert the occurrence of disease or the progression of disease from its early unrecognizable stage to one that is more severe" (p. 303).

Although worksites are an ideal setting to provide health promotion programs, the worksite health promotion movement is a relatively new one. Its history only dates back to the 1950s (Parkinson, 1982). *Healthy People 2010* (United States Department of Health and Human

Services, 2000), which is the nation's road map to health promotion and disease prevention, has several objectives specific to worksite wellness programs. The state goal of Objective 7-5 is to increase the proportion of worksites offering a comprehensive employee health promotion program to its employees while the goal of Objective 7-6 is to increase the proportion of employees participating in employer-sponsored health promotion activities. There are also objectives that address the issues of physical activity, nutrition, and smoking, specifically:

1. Objective 19-16 is to increase the proportion of worksites that offer nutrition or weight management classes or counseling.

2. Objective 22-13 is to increase the proportion of worksites offering employer-sponsored physical activity and fitness programs.

3. Objective 27-10 is to reduce the proportion of nonsmokers exposed to environmental tobacco smoke.

4. Objective 27-12 is to increase the proportion of worksites with formal smoking policies that prohibit smoking or limit it to separately ventilated areas.

5. Objective 27-13 is to establish laws on smoke-free indoor air that prohibit smoking or limit it to separately ventilated areas in public places and worksites.

In the past 25 years, the percentage of employers offering worksite wellness programs for their employees has increased. In 1990, only 81% of employers provided a health promotion program at the worksite (Aldana, Merrill, Price, Hardy, & Hager, 2005). Currently, one third of United States employers with 50 or more employees and half of those with 750 or more employees do offer health promotion programs meeting Healthy People 2010 criteria (Williams et al., 2007).

Worksites continue to be an excellent avenue to provide wellness programs to United States adults. According to the United States Department of Labor, Bureau of Labor Statistics, 66% of American adults were employed in 2007. Furthermore, American employees are spending increasingly more time at work (Soler, 2010). Worksites, additionally, offer the unique ability to reach diverse populations with regards to race, ethnicity, gender, age, and health status (United States Department of Labor, Bureau of Labor Statistics, 2008). The worksite also provides opportunities to influence employees' diet and physical activity behaviors (French, Story, & Jeffery, 2001). Worksite wellness programs could assist employers in their search for methods to keep healthy employees well and unhealthy ones from getting sicker.

Goetzel et al. (2007) present research showing that worksite health promotion programs support the three tiers of prevention efforts: primary, secondary, and tertiary. Primary prevention efforts are generally directed to healthy workers. In addition, primary efforts target employees who are currently not engaging in healthy behaviors and who may ultimately develop medical conditions that could be prevented or delayed if certain lifestyle behaviors were changed or adopted. Programs that discuss physical activity, healthy eating, and weight management are all examples of primary prevention efforts. Secondary prevention efforts are targeted to employees who already have an existing disease at its earliest stages to prevent significant morbidity. Examples of secondary prevention efforts include weight loss programs and screenings. The final type of worksite health promotion program is for tertiary prevention. Tertiary prevention is also known as disease management and is for individuals who already have developed a chronic disease such as cardiovascular disease, Type II diabetes, or asthma. The purpose of tertiary prevention programs is to help individuals better manage their symptoms so that disease progression is slowed down. Individuals enrolled in disease management

programs often report better compliance to medications along with adherence to outpatient treatment (Goetzel et al., 2007). In these programs, patient self-management is stressed. Other components of disease management programs include health promotion programs that address behavior change and reduction of risk. Disease management programs emphasize the idea of a health team that includes patients, their families, physicians, and other health care providers, along with the disease management staff.

Initial worksite wellness programs were comprised of interventions that primarily focused on individual behavior change (Everly & Feldman, 1985). Behavior change was obtained using educational and/or cognitive methods to modify lifestyle behaviors. Successful worksite wellness interventions were those that improved employees' knowledge, attitudes, beliefs, and skills thereby enabling employees to change their health behaviors (Wilson, Holman, & Hammock, 1996). Examples of behavior change programming included lunch and learn seminars and distribution of educational information. Initial worksite interventions targeted high-risk individuals. Multi-component programming, individual counseling, and the application of the transtheoretical model became more the norm (Chapman, 1997). Comprehensive programming that includes the larger environment is has been cited as necessary for employees to change (Stokols, Allen, and Bellingham, 1996).

A paradigm shift occurred nearly two decades ago when scholars and practitioners recognized the need to address health behaviors in the workplace at a social and environmental level (DeJoy & Southern, 1993; Stokols, Pelletier, & Fielding, 1996), rather than solely focusing on individual behavior changes. As the paradigm shifted, the "ecological model of health" that encompasses the sociocultural, political and physical environment was gaining greater acceptance among researchers and practitioners viable as a model for worksite wellness

programs (Stokols, 1992; Stokols et al., 1996). This model is especially relevant for workplaces since they are often their own ecology or community, with their own forms of communication, protocols, and cultures (Allen & Allen, 1985). In fact, environmental influences have been linked as a key contributor to excess weight gain, resulting in the development of the overweight and obesity epidemic (French, Story, & Jeffery, 2001). The often-cited "chameleon theory" states that employees will often change their own personal health behaviors to replicate their healthy worksite environment (Golaszewski, Barr, & Pronk, 2003). The components of an organizational health environment are the company's work factors, its physical structure, and its organizational culture (Golaszewski, Allen, & Edington, 2008). Because of the "chameleon theory," Golaszewski et al. (2003) state that the next generation of health promotion programs should also address social and environmental factors that have been proven to support a healthier, and thus more productive workforce. These health promotion programs would also encompass health management programs and would include such things as the worksite facilities and benefit plans (Golaszewski et al., 2008). According to Glanz, Sorensen, and Farmer (1996), successful worksite based interventions need to address and change the employees' environment and not solely the individual behaviors of employees.

According to Golaszewski et al. (2008), the worksite should also consider changing cultural factors such as the company's norms, values, symbols, and rituals. To create the most ideal worksite environment and healthier behaviors, external factors would come into play as well. Golaszewski et al. define these external factors as the broad business community, the community, and the household. As DeJoy (2003) states, healthy employees can be created and maintained if worksites would create healthy environments. The shift in intervention development and emphasis from individual behaviors to social and environmental factors within

the workforce has been termed as "organizational health promotion" (DeJoy & Wilson, 2003). The socioecological model of health promotion has gained popularity as scholars and practitioners have realized the importance of the roles social and environmental factors, coupled with individual's personal and interpersonal relationships, play in health promotion. The socioecological model states there are five different layers, or factors, that can influence an individual's decision regarding behaviors (McLeroy, Bibean, Steckler, & Glanz, 1988). These five layers are individual, interpersonal, organizational, community, and public policy. These five layers, working together, help shape an individual's health beliefs, attitudes, and behaviors. At the individual layer, changes can be made by motivating individuals to change behavior by increasing their knowledge, changing attitudes, assisting with development of skills, or challenging their beliefs. The interpersonal layer acknowledges that an individual's social circles, such as family and friends, provide social identity and support. At the organizational level, the focus is on altering the practices, policies, and even the physical environment of an organization. The community level focuses on organizing the variety of efforts of all members of the community to foster change by developing the relationships between the organizations within a community. Finally, at a public policy level, the priority is to develop and implement local, state, and national policies that can benefit health behaviors.

Popular worksite interventions have included health risk assessments, educational programs, blood pressure screenings, blood lipid screenings, and health coaching. Worksites that utilized interventions featuring incentives, access to workout facilities, availability of healthier foods, and target communication campaigns have been relatively successful in motivating employees to change their health behaviors (Engbers, van Poppel, Chin Paw, & van Mechelen, 2005).

Golaszewski et al. (2008) believe certain strategies need to be utilized within the workplace to create an organizational health support structure that will help individuals maintain long-term behavior change. Some of the theoretical concepts that are embedded within these strategies include social ecology, social learning theory, behavior modification, and social marketing. These strategies include creating a health initiative administrative structure, measuring the health supporting structure of the organization, adopting policies that are health-supporting, communicating an awareness of health issues, providing health-supporting services, developing health-supporting facilities, amending the benefits plan to support health behaviors, and promoting health supporting services and facilities (Golaszewski et al, 2008). Golaszewksi et al. (2008) believe that an environmental intervention will reach a greater percentage of employees, including those who are hesitant to participate in individual-focused interventions, and will be an excellent supplement to those individual-focused interventions. Interventions that target the social and environment factors of a worksite should have the greatest value since they will help individuals at low risk stay there and encourage medium risk and high risk employees to modify their behaviors (Engbers, van Poppel, Chin Paw, & van Mechelen, 2006; Eves, Webb, & Mutrie, 2006; Pratt et al., 2007).

Evaluation Definition and Genres

Evaluation has been described as any methodical analysis of the value or importance of an object or program (Scriven, 1998 & Shadish, Cook, & Leviton, 1991). According to Weiss (1999), the "overall aim of evaluation is to assist people and organizations to improve their plans, policies and practices on behalf of citizens" (p. 469). According to the CDC, evaluation is an integral part of any public health intervention. Research suggests many organizations do not use evaluation practices consistently nor do they incorporate them appropriately into their

policies and procedures (CDC, 1999). While many organizations preach about the importance of planning for evaluation during planning of the intervention, in reality, evaluation is often an after-thought despite the fact that evaluation is an important tool in the field of health promotion. Reasons for not conducting effective, efficient evaluations are varied but include limited program budgets, variety in the interventions utilized, and problems in correctly assessing the appropriate outcomes (Wong, Greenwell, Gates, & Berkowitz, 2008). One of the purposes of evaluation can be to provide feedback regarding goals and outcomes of programs (Green & Glasgow, 2006). Health promotion practitioners perform evaluations for a variety of reasons including assessment of the intervention's effectiveness and development of interventions specifically for participants' needs (Bryant, Altpeter, & Whitelaw, 2006). There are five genres of evaluation. These genres of evaluation are the following: evaluation for policy and macro decision making; evaluation for accountability; evaluation for learning, education, and use; evaluation for contextual understanding, and evaluation for democratization. Many evaluators and evaluations fall under several genres of evaluation.

The first genre of evaluation is evaluation for policy and macro decision making. This type of evaluation is used frequently in health promotion evaluation. Campbell (1981) describes this genre of evaluation as one where evaluators "work with government, or the critics of government, in trying to assess the impact of governmental programs designed to cure social ills" (p. 14). Evaluation is a crucial component to any physical activity and public health program and policy development and implementation because it documents and disseminates evidence-based practices (Brownson, Baker, Leet, & Gillespie, 2003). Evaluation, also, can be used to prove what components of a program or policy worked or did not work after implementation (Kelly, Hoenhner, Baker, Brennan-Ramirez, & Brownson, 2006). Knowing

what works or does not work helps practitioners and policy makers recognize what is needed to create effective, efficient policies and interventions. Policy oriented evaluation allows specific groups and society as a whole to become aware of the effects of different choices on their specific interests (Weiss, 1999). Policy oriented evaluations allow for organizations to improve their plans and practices by providing useful, salient information to practitioners so they can re-evaluate what they are doing (Weiss, 1999).

The second genre of evaluation is evaluation for accountability. Feller (2002) states performance measurement is needed to "demonstrate accountability to external sponsors and other stakeholders" (p. 438). Feller (2002) also goes on to discuss how performance measurements can be a factor in changing and improving an organization's performance. For many public health programs, their funders want to gauge an intervention's status regarding the achievement of vital benchmarks, which can be used to assess progress and performance, not only of the program but of the organization, itself. Program administrators can use a program's status to manage and make decisions about the public health program. Accountability-oriented assessment can help identify the "intermediate outcomes that connect program activities to program goals" (p. 92, Wholey & Newcomer, 1997). Recognizing program goals is an important step in creating indicators that are meaningful to both program management and program staff.

The third genre of evaluation is evaluation for learning, education, and use. Prominent theorists in this field include Carol Weiss, Michael Patton, Preskill, and Torres. Patton focuses on utilization-focused evaluation. Patton (1997) discusses how "focus in utilization-focused evaluation is on intended use by intended users" (p. 20). Patton (1997) also advocates "finding out things that can be used" (p. 17). Preskill and Torres (1999) describe this genre of evaluation as "an ongoing process for investigating and understanding critical organizational issues (pg. 1).

This description is especially important in the practice of public health where health promotion programs can succeed or fail based on an organization's commitment, personnel, and resources. This genre of evaluation is also important in public health and health promotion evaluation because of the organizational shift of expecting "employees to do more and more with fewer and fewer resources (p. 2, Preskill & Torres, 1999). Public health organizations are being asked to provide more health promotion programs without fewer resources to successfully develop, implement, and evaluate these programs. Evaluation for learning, education, and use rely heavily on the use of program theory and logic models (Weiss, 1999) Program theory can be described as the assumptions of how a program should work (Rogers, Petrosino, Huebner, & Hacsi, 2000).Program theory can be developed by a variety of individuals through a variety of mechanisms (Rogers, Petrosino, Huebner, & Hacsi, 2000). Program theory developers can include the evaluator, program staff, and program administrators while these mechanisms can include interviews with program staff, evaluation of program documents, and observations (Lipsey & Pollard, 1989). Program theories are important in this genre of evaluation because it helps answer the question of why some programs work while others fail to work (Rogers, Petrosino, Huebner, & Hacsi, 2000). Program theory evaluations are crucial to program development, especially in public health, because it can expose weaknesses in the program before the program is fully up and running (Weiss, 1995). Weiss (2000) states theory-based evaluations add knowledge and "small increments of knowledge about how and why programs work or fail to work cannot help but improve program effectiveness" (p. 44). Logic models are also a critical component of this genre of evaluation because The W.K. Kellogg Foundation (2004) suggests that logic models "provide stakeholders with a road map describing the sequence of related events connecting the need for the planned program with the program's desired results.

Mapping a proposed program helps you visualize and understand how human and financial investments can contribute to achieving your intended program goals and can lead to program improvements" (p. 3). Use of logic models allows for The W.K. Kellogg Foundation (2004) suggests that logic models "provide stakeholders with a road map describing the sequence of related events connecting the need for the planned program with the program's desired results. Mapping a proposed program helps you visualize and understand how human and financial investments can contribute to achieving your intended program goals and can lead to program improvements" (p. 3).

The fourth genre of evaluation is evaluation for contextual understanding. This genre takes into account the context of events. In this genre of evaluation, the evaluator should be a responsive one. During this type of evaluation, the evaluator provides a rich description of the context surrounding the event. Often the knowledge gain from this type of evaluation reflects the values of the evaluand. Evaluation for contextual understanding relies heavily upon the concept of "lived experiences." This type of data uses primarily qualitative data and can be presented in the form of case studies or ethnographies. It is important for the evaluator not to present judgment. Primary users of this type of evaluation include practitioners and marginalized groups. In this genre of evaluation, it is essential for the evaluator to be culturally competent and sensitive.

The last genre of evaluation is evaluation for democratization. This genre of evaluation is heavily influenced by the theorists, Ernie House and Kenneth Howe. House and Howe (1999) suggest three requirements exist for deliberative democratic evaluation. In order for an evaluation to be considered a deliberative democratic one, it should be inclusive, dialogical, and deliberative. An inclusive evaluation is one that accounts for all relevant interests, not just the

interests of the most powerful or those with the loudest voice. House and Howe (1999) state evaluations should "be accurate representations of reality, not fictional devices for furthering the interests of some over others" (p. 98). In this form of evaluation, it is crucial for the evaluator to design the evaluation so all relevant interests and power imbalances are addressed. Too often, the needs of the under-represented and marginalized populations are not adequately addressed (House & Howe, 1999).

Public Health and Evaluation

Because improving and maintaining the public's health is the main purpose of public health professionals, it is imperative to evaluate the effects of public health actions. These actions include policies and programs. Evaluation is critical in the field of public health because it helps to determine effects of public health programs and policies. Evaluation is also important because it accomplishes the CDC's principles for public health activities.

Steps in Program Evaluation

There are six fundamental steps in conducting program evaluation. These steps include involving all pertinent stakeholders, defining the program, focusing the evaluation design and methodology, collecting reliable and trustworthy evidence and data, validating results, and ensuring utilization of findings and sharing lessons learned with all stakeholders (CDC, 1999).

The first step of program evaluation is to engage stakeholders in the evaluation. Stakeholders include individuals or organizations that have a vested interest in learning from the evaluation and using the results from the evaluation. From a worksite wellness perspective, stakeholders can include employees involved in the program, employees not involved in the program, middle management, upper management, human resources personnel, and even families of employees. If stakeholders are not involved in the planning of the evaluation, the

evaluation's results can be disregarded or criticized because the evaluator and evaluation did not acknowledge stakeholders' concerns or opinions (Joint Committee on Standards for Educational Evaluation, 1994). There are three primary groups of stakeholders that should be identified and engaged prior to starting an evaluation: individuals involved in program operations, individuals who are served or affected by the program, and primary users of the evaluation (CDC, 1999). Individuals engaged in program operations include funding officials, administrators, managers, and staff (CDC, 1999). These individuals are pertinent to an evaluation's success because knowledge obtained from an evaluation may alter the delivery and dissemination of programs based on what is obtained from the evaluation. Individuals who are served by or affected by the program are also important to engage in an evaluation. These individuals may receive services directly or indirectly. These individuals may offer different perspectives (e.g. someone who has a positive opinion of a program versus someone who does not) that will help provide credibility to an evaluation since both proponents and opponents were consulted. Finally, primary users of the evaluation include individuals who are able to use knowledge from the evaluation to enhance the program. By engaging stakeholders early in the evaluation process, the evaluator can overcome obstacles to obtaining information and will be able to conduct an evaluation that is credible and meets all stakeholders' needs.

The second step in program evaluation is describing the program. When an evaluator is defining the program, it is essential that s/he adequately describe the program's missions and objectives. These descriptions should be detailed enough to demonstrate the program's goals and strategies. Having a detailed program description is vital for comparing similar programs and connecting different program parts to their effects (Joint Committee on Standards for Educational Evaluation, 1994). A program description should include a statement of need,

expected effects, program activities, resources, stage of development, context, and logic model (CDC, 1999). A statement of need explains the problem the program focuses on and how the program will impact this problem (e.g. a worksite wellness program focuses on employees' physical inactivity levels and will implement pedometer programs). A statement of expected effects demonstrates benchmarks the program must achieve to be considered effective. Expected effects can be immediate, short-term or even long-term. A program's activities are both internal and external factors that comprise a program. Program activities include any steps, strategies, or actions involved with program implementation and development (CDC, 1999). Stage of development refers to the fact that health programs, like all programs, evolve over time. It is imperative for an evaluator to consider the maturity of the program while conducting an evaluation (Eoyang & Berkas, 1999). There are three phases of development: planning, implementation, and effects. An evaluator must be cognizant of the stage of development a program is in before evaluating it. A program's context encompasses a variety of factors, influencing the program and its operations. These factors include the program's setting and environmental influences. Environmental influences include the program's history, geography, and social and economic conditions. Assessing and understanding a program's context is vital in planning a context-sensitive evaluation. Additionally, understanding a program's context is important in interpreting findings and determining generalizability of findings. Finally, a logic model is important in a program description because it provides a sequence of steps that are needed for how a program should work. Logic models can take on a variety of forms, including flow charts, maps, or tables (CDC, 1999). A logic model is a visual representation of the components and sequence of events needed to obtain meaningful program results. A logic model uses several components to link processes to effects. Logic model components include inputs,

activities, outputs, short-term outcomes, intermediate outcomes, and long-term outcomes (W. K. Kellogg Foundation, 2004). Development of a logic model is instrumental in enhancing a program's direction by defining a program's strategies (CDC, 1999).

The third step in evaluation is to focus the evaluation design. According to Patton (1997), evaluations must be designed to measure stakeholders' most pressing issues while being conducted as efficiently as possible. Patton (1997) also states evaluations should be designed with intended users in mind. Taylor-Powell, Steele, & Doughlah (1996) state a comprehensive evaluation design should not only be useful but feasible along with ethical and accurate. A comprehensive evaluation design should address purpose, users, uses, questions, methods, and agreements (CDC, 1999). The purposes of public health evaluations can be categorized into four overarching areas: 1) to gain insight, 2) to change practice, 3) to assess effects, and 4) to affect participants (CDC, 1999). It is also important to address users of the evaluation since user involvement is crucial for assessing pertinent questions and using relevant methods (CDC, 1999). While addressing users of the evaluation is important, uses of the evaluation is just as critical. Each use of the evaluation should be linked to a user of the evaluation (CDC, 1999). Patton (1997) emphasizes designing an evaluation plan that focuses on "intended use by intended users" (p. 20). The fourth component of developing the evaluation design is to establish evaluation questions. Evaluation questions create limits for the evaluation by determining the components of the program that will be evaluated (Weiss, 1998). Development of evaluation questions assists stakeholders with narrowing the focus of the evaluation. Another component of evaluation design is selecting the methodology to be used in implementing the evaluation. The three most commonly used designs for evaluation research are experimental, quasi-experimental, and observational (Bickman, & Rog, 1998). Evaluators should select methods appropriate for

answering stakeholders' questions by choosing methods appropriate for primary users, uses, and questions (CDC, 1999). Selecting an appropriate methodology influences the extent to which program participants will be involved in the evaluation, data sources used, data collection instruments used, data collection processes, data management systems, and data analysis and presentation (CDC, 1999). Another component of developing the evaluation design is agreement. Worthen, Sanders, & Fitzpatrick (1997) define agreement as a summary of procedures and responsibilities of everyone involved in the evaluation. According to Taylor-Powell, Steele, & Doughlah (1996), as part of the agreement, there is discussion of how available resources will be used to implement the evaluation plan. These resources include money, time, personnel, and data. Depending on the formality of the evaluation, the agreement may take several forms, such as a legal contract or memorandum of understanding. Creation of an agreement is important because it clarifies what is needed for an effective evaluation while providing a basis for modifying evaluation procedures, if needed (CDC, 1999).

The fourth step in program evaluation is collecting credible and trustworthy evidence. It is important to collect credible evidence in order to present a well-rounded picture of the program. A well-rounded picture will present both negative and positive findings. In order to provide credible evidence, evaluators should use a variety of methods to collect, analyze, and interpret data. Trustworthiness of the data can also be enhanced by encouraging stakeholders' involvement in the data collection process. Fetterman, Kaftarian, & Wandersman (1996) discovered stakeholders were more likely to believe evaluation's findings and utilize the findings and recommendations if the stakeholders were involved in the data collection. There are five components to the data collection process: indicators, sources, data quality, data quantity, and logistics (CDC, 1999). The first component, indicators, describes the program's components

relevant to the evaluation's questions (Innes, 1990 & McRae, 1985). According to Eddy (1998), indicators specify the parts of the program that are significant for monitoring purposes. Indicators can be defined and tracked from program inception to program completion. Program indicators include assessments of program activities and program effects. Program activities include participation rates, participants' satisfaction levels, or intervention duration while program effects involve changes in participants' behaviors, changes in health status, changes in quality of life, or changes in policies (CDC, 1999). While too many indicators may be an unrealistic approach to an evaluation, especially since there are usually limited resources available, it is important to have more than one indicator to successful measure the program's implementation and effects. Another important component of gathering credible evidence is the source of the evidence. There are three categories of sources: people, documents, and observations (CDC, 1999). People include program staff, program participants, program non-participants, or program administrators. Documents include database records, maps, needs assessments, previous evaluation reports, or newsletters while observations include meetings, events, and service encounters. Using multiple data sources enhances credibility of the data, thus the evaluation, by providing different viewpoints of the program. Additionally, using multiple data sources allows for the use of both quantitative and qualitative data collection. Use of a mixed-methods approach, enhances data credibility by ensuring the data collected will cover a variety of areas. Having a variety of data will help meet the needs of diverse users, thereby promoting use of the findings and recommendations (Frechtling & Sharp, 1997). Data quality is an integral part to a research study. An evaluation's data quality refers to how appropriate, trustworthy, and reliable the information is (CDC, 1999). Data quality can be influenced by indicators, instrument design, data collection procedures, source selection, data management, and

error management (CDC, 1999). Data quality is the amount of data collected during an evaluation. Data quality is important because it influences the evaluation's confidence level and power. Finally, logistics refers to the "methods, timing, and physical infrastructure for gathering and handling evidence" (CDC, 1999). The evaluator must choose the appropriate strategy for collecting data. The strategy must be appropriate for the data source, analysis plan, data dissemination plan. Additionally, evaluators need to be cognizant of cultural competency. Each program and program setting has its own culture; therefore, an evaluator must be culturally aware and competent while conducting an evaluation (Hood, 1998). An evaluator must be aware of body language, nuance of intonation, and nonverbal cues of communication (Hood, 1998). Logistics also involves ensuring participants' confidentiality and privacy (Newman & Brown, 1996).

The fifth step to program evaluation in public health is justifying results. Justification of results includes standards, analysis, interpretation, judgment and recommendations (CDC, 1999). Standards refer to the stakeholders' values and "provide the basis for forming judgments concerning program performances" (CDC, 1999). Standards can be norm-referenced or criterion-referenced (CDC, 1999). Examples of standards include program objectives, feasibility, sustainability, participants' needs, and resource efficiency (CDC, 1999). These standards can be used to judge a program's merit. Data analysis and synthesis are important for detecting findings and combining data sources to achieve a better understanding of the phenomenon. Data analysis and synthesis is influenced by the evaluation questions, data sources, and feedback from the evaluation's primary users and stakeholders. Weick (1995) defines interpretation as the process of understanding the meaning of the evaluation's findings, both at a micro and macro level. While interpreting data, an evaluator should examine the

practical significance of the findings. As an evaluator interprets the data, s/he should use stakeholders' viewpoints to better understand the findings. Another part of justifying conclusions is to provide recommendations. Recommendations include any "actions for consideration resulting from the evaluation" (CDC, 1999). Scriven (1998) states program evaluation is unique because recommendations made during program evaluations necessitates information that goes behind the data needed to evaluate program performance. Rogers and Hough (1995) suggest evaluators consider the context, especially the organizational context, when making recommendations. Recommendations may be better received by stakeholders and users if evaluators share draft recommendations and ask feedback from multiple stakeholders (CDC, 1999).

The final step in program evaluation is to ensure use and sharing lessons learned. Evaluators and stakeholders need to make a conscientious effort to make sure evaluation findings are used and distributed. There are five components needed to ensure utilizations of an evaluation: design, preparation, feedback, follow-up, and dissemination (CDC, 1999). An evaluation design is critical to ensure appropriate use of an evaluation. The evaluation's design includes its questions, methodology, and processes. Patton (1997) advocates designing an evaluation from the start with intended uses and users in mind. By designing a utilization-focused evaluation, the evaluator and stakeholders know initially how the findings will be used and who will gain from the findings. Additionally, a logically design evaluation plan will clarify the evaluation's relevance, reliability, and usefulness. Another factor to consider is preparation. Preparation is defined as actions taken to practice, organize, and arrange for eventual use of the findings of the evaluation (CDC, 1999). Preparation can be done by discussing with stakeholders, prior to the completion of the evaluation, of how findings will affect decisions

(Zaltman & Barabba, 1990). Stakeholders can be given hypothetical results to help them think about decisions they would make based on this knowledge (CDC, 1999). Preparation is particularly useful when there are negative findings from the evaluation. Preparing with stakeholders for negative findings, along with positives one, allows stakeholders time to examine the implications of the results and to determine options for program refinement (CDC, 1999). Another important factor for ensuring use of findings is feedback. Feedback is especially crucial in evaluations because trust is needed for both the evaluator and the stakeholders. Feedback can be given by providing preliminary findings and interpretations intermittently throughout the evaluation process. Evaluators can also provide draft reports to stakeholders and primary users during the evaluation. Another component for ensuring evaluation use is follow-up. The CDC (1999) defines follow-up as support, both technical and emotional, that evaluation users require during the evaluation process and also after the evaluation findings have been disseminated. Evaluators should conduct follow-up to make sure intended users are planning to still use the evaluations. Evaluators also should conduct follow-up to make sure evaluation findings are not being misused (Patton, 1997). Misuse may occur when stakeholders take the evaluation's findings out of context or when they use findings for intentions other than the previously agreed upon intentions. The last part of ensuring use of findings is dissemination. Dissemination is defined as "the process of communicating either the procedures or the lessons learned from an evaluation to relevant audiences in a timely, unbiased, and consistent basis" (CDC, 1999). There are many methods of disseminating the evaluation findings. A commonly used method is a formal evaluation report. A formal evaluation report, however, is not always the best means of disseminating the information. Regardless of the dissemination method, the evaluator should discuss the preferred choice of dissemination method with key stakeholders and intended users in

advance. Dissemination of the evaluation should include discussion of the evaluation and its limitations, strengths of the evaluation, and weaknesses of the evaluation (Worthen, Sanders, & Fitzpatrick, 1997). Additionally, the evaluation findings should be presented in a format tailored to the audience, which may include not only key stakeholders and primary users but participants and nonparticipants of the program (Worthen, Sanders, & Fitzpatrick, 1997).

Discussion

A review of the literature demonstrates the significant impact the overweight and obesity epidemic has on the American population, especially on the employed population. All the studies reviewed linked physical inactivity and poor diet to the increases in overweight and obese adults. The researchers also demonstrated a positive correlation between BMI and health care costs.

The overweight and obesity epidemic in the United States is the direct result of the significant increase in BMIs for both adults and children. The studies demonstrate that certain populations are at a higher risk of becoming either overweight or obese due to health disparities. Race/ethnicity (e.g., African-American, Hispanic-American) along with those with low socioeconomic status, for example, put individuals at higher risk of being afflicted with weight management issues. Various studies have revealed that individuals who are overweight or obese are at higher risk of being afflicted with certain medical conditions, including but not limited to hypertension, cardiovascular disease, and osteoarthritis. Overweight or obese individuals are more likely to have shortened life expectancies. Overweight or at risk of overweight children and adolescents are at higher risk of becoming overweight and obese adults.

One of the causes of overweight and obesity is physical inactivity. All of the review studies clearly demonstrated that engaging in physical activity on most, if not all days of the

week assists adults in obtaining and maintaining good physical and mental health. Physical activity has been linked to improving cardiorespiratory fitness, reducing risk of premature death, decreasing fatigue, improving cognitive functioning, and decreasing depression among other health benefits. Despite the overwhelming evidence linking physical activity to good health, the percentage of Americans who remain physically inactive is alarming. Unless Americans decide to incorporate more physical activity into their lives, the chances of seeing a reduction in the overweight and obesity epidemic are not promising.

Besides affecting individual physical and mental health, the overweight and obesity epidemic has affected health care costs in America. Many Americans receive their insurance from their employment. Significant data exists demonstrating the positive correlation between higher than average BMI and health care costs, including doctor and hospital visits. Overweight and obese employees also demonstrate higher rates of absenteeism and presenteeism than their normal weight employees. Both absenteeism and presenteeism affect a company's productivity and profits.

Worksite wellness programs have become more and more popular as companies attempt to find successful strategies to encourage their employees to live healthier lifestyles. Whereas initial worksite wellness programs that focused on physical activity and nutrition were more individually-tailored, present-day physical activity and nutrition interventions at the worksite are focused on changing company policy and environment along with employees' attitudes, knowledge, and beliefs. The shift from individual-focus to a policy and environmental focus fits the socioecological model of change, a commonly used paradigm in overweight and obesity prevention work.

One method to assess the effectiveness of worksite wellness programs is to use program evaluation. Program evaluation is a vital part of any public health intervention. Although many organizations do not use evaluation practices consistently, the inclusion of program evaluation would improve program design and implementation. There are a variety of reasons for not doing evaluations, including limited budgets, inadequate resources, and limited knowledge. There are five genres of evaluation and each genre has its own unique role in the field of public health evaluation.

Conclusion

The overweight and obesity epidemic in the United States is exacting a toll on the nation and its resources. As overweight and obesity rates continue to rise, so do health care costs, placing a burden on the nation's resources. Since a large majority of the American adult population is employed, the worksite is an excellent site to develop and implement physical activity and nutrition interventions that will hopefully help slow, if not reverse, the overweight and obesity problem. The recent increases in companies' health care costs are forcing upper-level management to consider innovative methods to reduce health care costs. Since a majority of health care costs are associated with modifiable risk factors such as physical inactivity, poor diet, and tobacco use, interventions designed to improve these health behaviors will ultimately lead to better health outcomes for employees, which will also result in lower health care costs for employers and employees. Worksites are also beginning to understand the importance of changing the workplace environment and culture in order to help employees adopt and maintain healthy lifestyle behaviors. One important step to understanding the components of successful and effective worksite wellness program development and implementation is to conduct consistent and thorough program evaluations. By understanding which factors help determine

effective worksite wellness programs, practitioners, researchers, and companies can help develop and implement these programs, resulting in a healthier United States workforce along with lower medical costs.

CHAPTER 3

METHODS

The study applied an evidence-based, behavior change curriculum in a worksite setting. Active Living Every Day (ALED) was developed by researchers at the world-renowned Cooper Institute in Dallas, Texas. ALED is managed by Human Kinetics Publishers, Inc. through a partnership with the Cooper Institute called Active Living Partners. The original research used to develop ALED was from Project Active and was conducted August 1, 1993 to August 31, 1997 (Dunn, Marcus, Kampert, Garcia, Kohl, et al., 1997). Project Active, designed to help individuals overcome barriers to becoming physically active, compared the effects of a structured exercise program with the effects of a lifestyle physical activity program. Results from the Project Active study have demonstrated that lifestyle programs promoting the accumulation of moderate-intensity physical activity along with the development of behavior change skills are as effective as traditional fitness-center based structured exercise programs (Blair, Kohl, Gordon, & Paffenbarger, 1992). Project Active encouraged individuals to increase physical activity by increasing moderate-intensity physical activity as part of their daily routines (Dunn, Marcus, Kampert, Garcia, Kohl, et al., 1997).

The foundation of Project Active is built upon several psychological models and theories (Dunn, Marcus, Kampert, Garcia, Kohl, et al., 1997). The behavior-change theories that formed the basis for Project Active and then ALED are social cognitive theory, the transtheoretical model, decisional balance theory, the relapse prevention model, and socioecological model. The models and theories work together to help individuals learn behavior change strategies that are needed to change and maintain behavior.

Social Cognitive Theory (SCT), which was developed by Bandura in the 1980s, states that an individual's beliefs, values, and behaviors interact with each other and the environment to influence the individual's behavior (Glanz, Lewis, & Rimer, 1990). One of the key characteristics of SCT is the construct of self-efficacy. Self-efficacy is defined as the level of belief or confidence an individual has that 1) s/he has the ability to adopt a specific behavior (e.g., increasing physical activity) and 2) the behavior change will have the intended effect (e.g. better health, less stress, less fatigue). An individual's self-efficacy has been cited frequently as a strong predictor of whether an individual will become and stay physically active (Dishman, Sallis, & Orenstein, 1985; King, Blair, Bild, Dishman, Dubbert, et al., 1992; Marcus, Bock, Pinto, Forsyth, Roberts, et al., 1998; McAuley & Courneya, 1993).

Another theory used in ALED is the Decisional Balance Theory (DBT). DBT is based on the premise that an individual weighs the benefits and costs when deciding to undergo a behavior change (Janis & Mann, 1977). Decision making involves assessing eight different concerns and deciding the pros and cons of the specific behavior change. These eight concerns are: 1) benefits to self, 2) benefits to others, 3) costs to self, 4) costs to others, 5) approval from self, 6) approval from others, 7) disapproval from self, and 8) disapproval from others. The basic premise is that when benefits of making the change in behavior outweigh the costs of such a change, the individual is more likely to change their behavior.

The Relapse Prevention Model (RPM) focuses on the notion of relapse in individuals who are undergoing behavior change. The focus of the RPM is to help individuals recognize that relapse is a normal and expected part of behavior change (Marlatt & Gordon, 1985). In addition, the RPM helps individuals recognize high-risk situations for relapse and to develop strategies for managing these difficult situations. From a practitioner's viewpoint, the RPM helps practitioners

encourage flexibility in methods for assisting individuals with achieving their behavior change goals.

The Transtheoretical Model (TTM), or "stages of change" model, is a hybrid of several behavior-change theories. The TTM's foundation is that individuals can make changes by appropriately matching their specific actions and behavior change strategies to their stage of change (Prochaska, DiClemente, & Norcross, 1992). Although the TTM was initially developed for smoking cessation programs (Prochaska & DiClemente, 1983), the model has also been used to change physical activity behavior (Dunn, Marcus, Kampert, Garcia, Kohl, et al., 1997; Marcus, Rossi, Selby, Niaura, Abrams, 1992). Individuals move through the five stages of change at different paces and there is often regression (i.e., movement back to an earlier stage). Additionally, the stages are cyclical rather than linear since it can take many tries for an individual to become and stay physically active. The five stages in the TTM are 1) precontemplation, 2) contemplation, 3) preparation, 4) action, and 5) maintenance. Each stage has its unique attributes and characteristics. Helping individuals identify the stage they are in then assists in providing participants with appropriate behavior change strategies. Individuals in the precontemplation stage are inactive and are not thinking about changing their behaviors to become active. Individuals who are in precontemplation usually have low levels of confidence, or self-efficacy. Additionally, individuals in the precontemplation stage report fewer pros than cons to being physically active (Prochaska, Velicer, Rossi, Goldstein, Marcus, et al, 1994). Contemplators, while inactive, are at least thinking about becoming more physically active. Contemplators, like precontemplators, still report more cons than pros of becoming physically active (Prochaska, Velicer, Rossi, Goldstein, Marcus, et al, 1994). Individuals in the preparation stage are physically active, but not at recommended levels. At this stage, the cons of becoming

physically active are equal to the pros of becoming physically active. Participants who are in the action stage are physically active at the recommended levels; however, they have not been physically active for more than 6 months. At the action stage, the number of pros exceeds the cons. Once an individual has been physically active at the recommended levels for 6 or more months, they are considered to be in the maintenance stage and report more pros to being physically active than cons. As individuals progress through the five stages, they use different processes of change to make behavior changes (Marcus, Rossi, Selby, Niaura, & Abrams, 1992). Processes of change can be categorized into either cognitive or behavioral strategies. Cognitive strategies include increasing knowledge, becoming aware of risks, recognizing consequences of the health behavior on others, understanding benefits, and increasing healthy opportunities. Behavioral strategies include making a commitment, rewarding oneself, reminding oneself, finding alternatives, and developing and using social support networks. Individuals who are in preparation stage use cognitive strategies the most while individuals in the action stage use behavioral strategies more frequently.

Finally, the Socioecological Model (SEM) discusses the important role an individual's physical and sociocultural environments play in behavior change (Stokols, Pelletier, & Fielding, 1996). There are a variety of factors that work cohesively to influence one's behaviors. These factors are intrapersonal, interpersonal, organizational, community, and policy. At the individual level, changes can be made by motivating individuals to change behavior through increasing their knowledge, changing attitudes, assisting with development of skills, or challenging their beliefs. The interpersonal level acknowledges that an individual's social circles, such as family and friends, provide social identity and support. At the organizational level, the focus is on altering the practices, policies, and even the physical environment of an organization. The

community level focuses on organizing the variety of efforts of all members of the community to foster change by developing the relationships between the organizations within a community. Finally, at a public policy level, the priority is to develop and implement local, state, and national policies to promote and benefit health behaviors. Working together, these five levels have a profound impact on an individual's health behaviors. Research has demonstrated that physical activity interventions are most effective and efficient when multiple levels are targeted simultaneously. Because ALED is a behavior change intervention, the levels targeted are the interpersonal and intrapersonal levels.

Research Design

The research design employed mixed methodology. Both quantitative and qualitative data were collected. Quantitative data were collected in the forms of questionnaires while qualitative data were collected via focus groups. Quantitative data were used to assess the effectiveness of the ALED intervention. Qualitative data were used to tailor the ALED curriculum to meet the unique needs of the Champaign-Urbana Mass Transit District (CUMTD) population.

A worksite-based physical activity intervention was delivered at the CUMTD campus in Urbana, Illinois. The physical activity intervention was centered around ALED, an evidence-based physical activity behavior change program developed by researchers at The Cooper Institute in Dallas, Texas, that uses the several different behavior change theories and models to help individuals change their physical activity behavior. The program, originally a 20-week intervention, was delivered using a 6-week curriculum. Traditionally, ALED is delivered in either a classroom setting or online. For the purposes of this study, a combination of textbook,

in-person weekly group discussions, and on-line resources were utilized. In-person meetings were conducted for 45 minutes each week.

There were two phases of the intervention. The first phase of the intervention took place in October and November 2010. The second phase of the intervention occurred in January and February 2011. The first phase of the intervention utilized ALED without any modifications made to the curriculum (i.e., non-tailored version). The first phase focus groups were conducted in December 2010 and, based on the results of the focus groups, modifications to the curriculum were made for the second phase of the intervention. Two focus groups were conducted: one for employees who completed the program and one for employees who did not. The second focus group phase was conducted in late February/early March 2011. The second focus group phase was used to determine the effectiveness of the tailored program on decreasing participants' sedentary time and increasing health outcomes. Again, two focus groups were conducted: one for employees who completed the program and one for employees who did not. Focus group questions were developed by the researcher with assistance from the CUMTD Wellness Committee.

Intervention Tailoring: Research has demonstrated that interventions tailored to specific populations are more effective than general interventions (Dunn, Anderson, Jakicic, 1998; Marcus, Bock, Pinto, Forsyth, Roberts, et al., 1998). Although the ALED curriculum is a generic one, modifications can be made to ensure the curriculum meets the needs of a specific population, such as the CUMTD workforce. Tailoring of the curriculum to meet the needs of the CUMTD workforce was done by conducting focus groups after Phase 1 was completed and prior to the start of the Phase 2 intervention. The focus groups were used to obtain a better understanding of the needs of the CUMTD workforce in order to better tailor the curriculum.

Additionally, the focus groups assisted in determining whether the ALED intervention should be longer by identifying the dose-response of an intervention. There were two focus groups after Phase 1 was completed. Focus Group 1 involved CUMTD employees who completed all 6 weeks of the ALED intervention. Focus Group 2 was for CUMTD employees who did not complete all 6 weeks of the ALED intervention. The researcher used the theoretically created focus group protocol, Nominal Group Technique (NGT), to conduct the focus groups. NGT (Delbecq, Van de Ven, & Gustavson, 1975) was chosen rather than a traditional focus group protocol for several reasons. First, the NGT helps balance participation and influence among all participants (Elliott & Shewchuk, 2002). In addition, NGT usually generates more creative ideas and a greater number of ideas than traditional focus groups (Delbecq, Van de Ven, & Gustavson, 1975). Finally, the use of NGT has been demonstrated to result in greater satisfaction, greater sense of closure, and a greater sense of accomplishment for participants (Delbecq, Van de Ven, & Gustavson, 1975). NGT is a four-step process which takes advantage of pooled opinions (Delbecq, Van de Ven, & Gustavson, 1975). In the first step, each person in the group writes down their answers to the questions. In the next step, group members participate in a round-robin feedback session. In the third step, each recorded idea is discussed to clarify and evaluate the idea. Finally, each individual votes on the priority of the ideas, or themes, and then a mutual decision is based on the vote. In late February/early March 2011, two additional focus groups were completed. Focus Group 1 was for all CUMTD employees who completed ALED while Focus Group 2 was for those CUMTD employees who did not complete ALED. The purpose of the two focus groups was to determine whether methods to tailor the ALED intervention to the mass transit population were effective and to determine whether changing the duration of the ALED intervention was effective.

Logic Model: A logic model is a commonly used tool in public health interventions (CDC, 2010). Logic models are used to ensure a program's success and effectiveness. Logic models also "provide good information to practitioners so that they can re-consider what they are doing" (p. 470, Weiss, 1999). Logic models are used in three phases of a program's life: design and planning, implementation, and evaluation and reporting (W. K. Kellogg Foundation, 2004). A logic model was developed by the researcher for use by CUMTD administration, employees, and the Wellness Council. According to the W. K. Kellogg Foundation (2004), a logic model is a visualization of how an intervention works, helping to define the theory and assumptions underlying a program. A logic model provides stakeholders with a road map describing the sequence of related events connecting the need for the planned programs' intended results. The logic model development and use is a key step in fostering a sense of community among program staff, participants, and stakeholders (W. K. Kellogg Foundation, 2004). Logic models are excellent tools to help program developers produce better results by helping gather information to meet a clearly stated goal. A logic model links short-term and long-term outcomes with program activities and processes along with the program's theoretical assumptions and principles.

There are three frequently used logic model types: theory, approach, outcomes approach, and activities approach (W. K. Kellogg Foundation, 2004). The logic model developed for CUMTD ALED program used an activities approach model. According to the W. K. Kellogg Foundation (2004), an activities approach model focuses on "the specifics of the implementation process" (p. 10). An activities approach logic model "links the various planned activities together in a manner that maps the process of program implementation" (p. 10, W. K. Kellogg Foundation, 2004). This type of logic model is particularly useful in explaining what the

program's goals are and what activities and resources are needed to achieve these program goals. An activities approach model is used especially in program monitoring and management because the model gives specific steps that need to be completed in order to implement the program in an effective and efficient manner. A logic model can assist program managers to "define realistic goals, develop output and outcome measures, report results, and use information on goals and results to improve program effectiveness" (p. 98, Wholey & Newcomer, 1997). Essentially, an activities approach logic model helps explain to stakeholders and other interested parties how program activities help meet program goals.

Several existing logic model development templates are frequently used to develop logic models. The logic model development template used for this program is Program Implementation Template found in the Logic Model Development Guide: Using Logic Models to Bring Together Planning, Evaluation, and Action (W. K. Kellogg Foundation, 2004). At its basic form, a logic model consists of five components: 1) inputs (i.e., resources available), 2) activities (i.e., intentional parts of program implementation, including the processes, techniques, tools, events, technology, and actions of the planned program), 3) outputs (i.e., direct products of program activities), 4) outcomes (i.e., specific, measurable changes in program participants' behavior, knowledge, skills, status, and levels of functioning due to program participation), and 5) impacts (i.e., intended and unintended changes that occur due to program implementation). The input and activities component combined refer to the planned work needed for program implementation. Intended outcomes are comprised of the outputs, outcomes, and impacts components.

The first step, which has three mini-steps, in developing a logic model was to describe the results, which are outputs and outcomes. Short-term outcomes reflected changes that may

occur in the immediate future while long-term outcomes indicated changes that may happen in the next 1-5 years. The next step, which has two-mini steps, in creating a logic model was to describe the actions that will occur to ensure program outcomes, both short-term and long-term, as well as outputs and impacts are achieved. First, the researcher decided what specific activities were needed to achieve results. Once specific activities were decided, it was determined the resources that were needed to sustain the program. These resources include personnel, monetary funds, equipment, and even space. Once steps one and two are completed, the resources, activities, and results were placed into the Program Implementation Template for distribution to stakeholders. The development of a logic model will assist CUMTD staff in future program development, implementation, and evaluation. The logic model is depicted in a flow chart for easier use and understanding of processes (see Figures 3 & 4 in Chapter 4).

Participants

Mass transit workers were chosen for the intervention for a variety of reasons. In 2008, the transportation industry employed 387,155 individuals, and thus represents a large sector of the United States workforce (American Public Transportation Association, 2010). It has been well documented that transportation workers are at an increased risk of obesity, physical inactivity, and poor nutrition compared to individuals with other occupations (Winkleby, Ragland, Fisher, & Syme, 1988; Ragland, Krause, Greiner, & Fisher, 1998; Ragland, Greiner, Holman, & Fisher., 1987). Bus drivers, compared to individuals in other occupations, have higher rates of mortality, morbidity, and absence due to illness (Winkleby, Ragland, Fisher, & Syme, 1988). Research has demonstrated that a variety of factors, including individual behaviors and work environment characteristics, influence transportation workers' obesity prevalence and risk of excess weight gain (French, 2005). Transportation workers face long work hours, have

schedules focused on shift work, often lack scheduled breaks or meals, and lack healthy food choices and physical activity options either on the transportation routes or in the transportation centers (Ragland, Krause, Greiner, & Fisher, 1998). Transportation workers, additionally, have high stress and fatigue issues (Ragland, Krause, Greiner, & Fisher, 1998). French, Harnack, Toomey, and Hannan (2007) revealed that 62% of metropolitan mass transit employees found it difficult to be physically active while at work. The same study revealed that obese drivers were less likely to engage in moderate physical activity and were more likely to engage in sedentary behaviors, including sitting compared to overweight and normal weight drivers. The authors' findings suggest that worksite wellness programs targeting mass transit workers should focus on the bus drivers' willingness to increase regular physical activity as a method of weight management.

The CUMTD employs approximately 300 individuals and supports an on-site fitness facility. Of the estimated 300 employees, however, approximately 75-100 employees use the on-site fitness facility over the course of a typical month. Employees are categorized into three groups: operators, maintenance, and office/clerical staff. Operators consist of individuals who drive the bus routes and are often the public face of MTD. Maintenance staff is responsible for upkeep and preservation of CUMTD busses and equipment. Office and clerical staff manage the day-to-day operations associated with running an organization.

Participants were recruited using a variety of methods. The primary method of recruitment was to use the company's existing resources. Information was posted on the company's Intranet. Additionally, flyers and brochures were placed throughout the CUMTD campus and in break rooms. The second method of recruitment that was used was word of

mouth recruitment. CUMTD has a Wellness Committee that was used to publicize and recruit for the fall and winter interventions.

The initial design of the study, based on preliminary statistical sample size needs and translation of program into practice, called six groups of 10 participants each ($N = 60$) to be recruited for the intervention. Practical constraints limited the ability to recruit that number of participants. Some issues with participant recruitment included the novelty of the program, work schedule barriers, and time commitment issues. Participants were at least part-time employees for the CUMTD and were older than 18 years of age. In the first phase of the study, 17 individuals expressed interest in the ALED program. Of those 17 individuals, 9 signed informed consents, enrolling them into Phase 1 of the study. Of those 9 individuals, 7 completed all 6 weeks of the program. During the second phase of the study, Phase 2, 32 individuals expressed interest in the program during the recruitment period. Of the 32 individuals expressing interest in the program, 22 signed informed consents, enrolling them into the study. Of those 22 individuals, 19 completed the program.

Measures

Several different measures were used to assess the effectiveness of the ALED intervention. These measures were collected pre-intervention and at the end of the intervention. Participants completed questionnaires regarding their Physical Activity Readiness (PAR-Q; Canadian Society for Exercise Physiology, 1994),

Readiness to Change. The Readiness to Change questionnaire (Blair, Dunn, Marcus, Carpenter, & Jarrett, 2001) was used to assess the stages of change a participant was in. The measure contained 4 questions used to measure participants' physical activity levels. Based on the algorithm, one could be placed in "precontemplation" to "maintenance." This measure was

repeated post-intervention to determine if participants had moved along the stage of change continuum. The questionnaire asked participants if they were currently physically active or intended to become more physically active in the next 6 months. The questionnaire, also, asked if participants currently participated in regular physical activity, which was defined as at least thirty accumulated minutes of moderate intensity active don at least 5 days a week. The final question asked participants whether they had been regularly physically active for the last 6 months. Based on these responses, participants could be placed into "precontemplation," "contemplation," "preparation," "action," or "maintenance."

Physical Activity Changes: Physical activity changes were measured using the Actigraph accelerometer. Participants in both phases were asked to wear an accelerometer for 7 days prior to the start of the intervention and for 7 days after Week 6 of the intervention. Actigraph accelerometers were worn by the participants to measure physical activity. Activity was categorized as light, moderate, hard, and very hard. These categories were pre-determined by the Actigraph software. The Actigraph accelerometers, which were used, measured and categorized participants' activities by light, moderate, hard, and very hard.

Decisional Balance Measure. The Decisional Balance Measure (Marcus, Rakowski, & Rossi, 1992) is a 16-item questionnaire, which assesses an individual's perceived benefits and barriers to physical activity). The participant responds to each item using a 5-point Likert scale (1=not at all important, 2=slightly important, 3=moderately important, 4=very important, 5=extremely important). This measure is scored by calculating the averages of the 10 pro items (i.e., benefits) and the 6 con items (i.e., barriers). The difference in the averages (pros minus cons) is the decisional balance score. If an individual scores greater than a zero, it means the individual sees more benefits to physical activity than barriers. Larger values mean an individual

sees more benefits to physical activity than barriers. If an individual scores below zero, these negative scores mean the individual has more barriers to physical activity than benefits. As with the positive score, the larger the negative number, the more barriers the person perceives.

Processes of Change. Participants' processes of change were measured using the 40-item questionnaire created by Marcus, Rossi, Selby, Niaura, & Abrams (1992). These processes of change are 1) increasing knowledge, 2) being aware of risks, 3) caring about consequences to others, 4) comprehending benefits, 5) increasing healthy opportunities, 6) substituting alternatives, 7) enlisting social support, 8) rewarding oneself, 9) committing oneself, and 10) reminding oneself. The first five are cognitive strategies while the latter five are behavioral strategies. In the 40-item questionnaire, each process of change is assessed by 4 different questions. The participant responds to each item using a 5-point Likert scale (1=never, 2=seldom, 3=occasionally, 4=often, 5=repeatedly). An individual's score for each process of change is calculated by summing the scores for the four items comprising each process and dividing by 4.

Self-Efficacy. Self-efficacy was assessed using the Self-Efficacy Scale (Marcus, Selby, Niaura, & Rossi, 1992). The 5-item instrument assesses the key parts of self-efficacy. Self-efficacy was calculated by calculating the average of the five items for each participant. The 5-question instrument is measured from 1 (not at all confident) to 5 (extremely confident). Questions on this instrument asked participants to indicate how confident they felt in their ability to be physically active when tired, in a poor mood, busy, on vacation, or during poor weather.

Physical and Mental Health Status. Additionally, participants completed the Medical Outcomes Study 36-item Short Form Survey (SF-36; Ware, Snow, Kosinski & Gandek, 1993), which has physical and mental health summary measures. The SF-36 is a short form health

survey with 36 questions that measures 8 facets of health: physical function, physical role, body pain, general health, vitality, social functioning, emotional role, mental health, and reported health. These 8 facets are broken into two dimensions, physical and mental health statuses, which are then compiled to give a total SF-36 score. The scale goes from 0 to 100. A score of 100 correlates with very good health while a score of 0 correlates with very bad health. The SF-36 is scored by assigning a value of 1 to 6 for each question and summing up the totals for each dimension of health.

Fatigue. The Multidimensional Fatigue Inventory (MFI) (Smets, Garssen, Bonke, & De Haes, 1995) was used to assess participants' levels of fatigue. The MFI, a 20-item instrument, assesses five dimensions of fatigue: general fatigue, physical fatigue, mental fatigue, reduced motivation, and reduced activity. Higher numbers corresponded with higher levels of fatigue. Scores are obtained by reversing the scores on the 10 positive items (e.g. 1=5, 2=4, etc.) and then summing individual groups for the five dimensions. Scores can range from 4 to 20 for each dimension.

Sleep Quality. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI; Buysse, Reynolds, Monk, Berman, & Kupfer, 1989). The PSQI is a self-reported measure of one's quality of sleep, assessing sleep quality and disturbances over a one-month period. The 19-question instrument assesses seven dimensions of self-reported sleep quality: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. These seven dimensions compile an individual's global score. Scoring is based an algorithm developed by Buysse et al. (1989). Scores can range from 0 to 21, with higher scores indicative of poorer sleep quality.

Stress. The Perceived Stress Scale (PSS) (Cohen, Kamarck, & Mermelstein, 1983) measured participants' stress levels. The PSS is commonly used to assess an individual's perception of stress. The PSS assesses how stressful an individual finds situations in his/her life over the period of the last month. Scores on the PSS can range from 0 to 40. The higher the score on the PSS, the higher the individual's perceived stress. The score is calculated by reversing the scores on the four positive items (e.g. 0 = 4, 1 = 3, etc.) and then adding across the 10 items.

Activities of Daily Living. Activities of Daily Living Scale assessed individuals' abilities to complete activities of daily life. This instrument was created by McDowell and Newell (1996) and has 20 questions. This instrument is scored on a Likert scale from 1 ("Cannot Do") to 7 ("Can Do Easily"), with scores ranging from 20 – 140. The Activities of Daily Living measure is scored by summing up the scores for all 20 items. Higher scores correlate with higher functionality.

Affect. Affect was measured using the Feeling Scale (Hardy and Rejeski (1989). The Feeling Scale (FS) is a scale developed to assess an individual's changes in affect while engaging in exercise. An individual uses this scale to record how s/he feels while engaging in exercise. The scale ranges from -5 ("Very Bad") to 0 ("Neutral") to +5 ("Very Good"). Scores are simply the value the participant records while doing exercise.

Enjoyment of Physical Activity. the Physical Activity Enjoyment Scale (PACES) (Kendzierski & DeCarlo, 1991). The PACES is an 18-item questionnaire that assesses an individual's level of enjoyment about the physical activity they have just completed. The score is calculated by reversing the scores on the positive items (e.g. 1 = 7, 2 = 6, etc.) and then adding

all the items together. Higher scores on the PACES indicate participants are obtaining greater enjoyment from physical activity.

Procedures

The following procedures were used for both phases of the study. Data was collected at two points during the study: pre-intervention and post-intervention. Pre-intervention, participants completed demographic information forms along with medical histories. Baseline physical activity was determined using the 7-Day Physical Activity Recall. Participants in Phase 1 and Phase 2 of the intervention also wore Actigraph accelerometers to measure daily physical activity. Accelerometers were worn during Week 1 of the intervention and the last week of the intervention. Accelerometer data were used to whether the aim of the study of reducing sedentary behavior among mass transit employees was met.

After the first phase of the intervention, a focus group was held in December 2010 to learn how to tailor ALED to better meet the needs of mass transit employees. Initially, two focus groups were to be held: one for participants who completed the study and another for those who did not complete it. Due to lack of interest from the two participants who did not complete the study, a second focus group was not held. The focus group was conducted using the NGT. Findings from the focus group were used to identify methods to tailor ALED to the mass transit population. After the second phase of the intervention, a focus group was held in February 2011. As with the first phase, two focus groups were planned for the second phase: one for employees completing the program and another for employees who did not complete the program. The second focus group, however, was not conducted because of lack of interest from the individuals who did not complete the program. The focus group again used the NGT. The purpose was to

determine whether methods to tailor ALED to the mass transit worksite population were effective.

Statistical Analysis

Data from the questionnaires were scored or coded and entered into SPSS 19.0 for analysis. Univariate analyses were conducted to calculate descriptive statistics, including means and standard deviations. Additional analyses included a multivariate, single group repeated measures design, with one within-subjects independent variable used to examine the outcome measures. The independent, within-subjects variable was Time of Assessment. There were two time points assessed: pre-intervention and post-intervention. The dependent variables measured were sedentary level, readiness to change, benefits and barriers for physical activity, processes of change, self-efficacy, SF-36, fatigue, sleep quality, stress, ability to complete activities of daily life, affect, and physical activity enjoyment. A repeated measures analysis of variance (RM-ANOVA) was run for all variables. An overall multivariate analysis of variance (MANOVA) was conducted for dependent variables with multiple dimensions. These variables included processes of change, the SF-36, and fatigue. These analyses occurred separately with both Phase 1 and Phase 2 participants.

CHAPTER 4

RESULTS

The purpose of this study was to determine the effect of a worksite-based physical activity program on reducing sedentary time in a unique and understudied population, namely transit workers. There were three primary aims of the study. The first primary aim of the study was to examine the impact of an existing, evidence-based physical activity behavior change program in creating changes in physical activity behaviors and ultimately improving the health status of Champaign-Urbana Mass Transit District (CUMTD) employees, including reductions in fatigue and stress indicators. The second primary aim of the research study was to develop a framework to be used to tailor interventions for the worksite setting. The third primary aim of the study was to determine the worksite's specific needs for implementation of a worksite wellness program by developing a logic model.

This study had two phases. The first phase involved implementing the Active Living Every Day (ALED) program in a 6-week format without any tailoring. The second phase implemented the ALED program in a 6-week format with tailoring. Tailoring to the ALED program was done by conducting focus groups, using the Nominal Group Technique (NGT), immediately after the completion of the first phase of the study.

Participants

Participants were recruited from the CUMTD workforce. Recruitment methods included flyers and posters in the CUMTD main campus building, messages on the CUMTD intranet, articles in the CUMTD newsletter, and for the second phase of the study, word of mouth.

In the first phase of the study, 17 individuals expressed interest in the ALED program. Of those 17 individuals, 9 signed informed consents, enrolling them into the study. Of those 9

individuals, 7 completed all 6 weeks of the program (see Table 1 and Table 2). Two of the participants were males and 7 were females. The mean age was 47.6 ± 9 years, with a range of 35-58 years. Twenty-two percent of participants were African American, 11% were Hispanic, and 67 percent were Caucasian. Sixty-seven percent of participants were obese, 11% were overweight, 11% were normal weight, and 11% were underweight. Average BMI was 32.5 ± 8.9, with a range of 17.8-44.3. Fifty-six percent of participants were operators, 11% were maintenance, and 33% were administration/clerical staff. All participants were married. Eighty-nine percent of participants were full-time employees while 11% were part-time employees. Fifty-six percent were non-smokers, 22% were smokers, and 22% were former smokers. Thirty-three percent earned between $75,000-89,999, 33% earned $60,000 - $74,999, 11% earned $45,000 – 59,999, 11% earned $30,000-44,999, and 11% earned $15,000-29,999. Twenty-two percent had earned an associate's degree, 11% had a vocational/technical school degree, and 67% had a high school degree. None of the participants reported being diagnosed with heart disease or diabetes. Twenty-two percent had hypertension and another 22 percent had arthritis. Fifty-six percent self-reported their stress level as occasionally, 33% as frequently, and 11% as constantly.

The second phase of the study had 32 individuals expressing interest in the program. Of the 32 individuals expressing interest in the program, 22 signed informed consents, enrolling them into the study. Of those 22 individuals, 19 completed the program (see Table 3 and 4). Fifty-nine percent of the participants were males and 41% were females. The mean age was 46.6 ± 11.7 years, with a range of 27 to 72 years. Nine percent of participants were African-American and 91% were Caucasian. Fifty-five percent of participants were obese, 32% were overweight, and 13% were normal weight. Average BMI was 32.1±1.9, with a range of 21.6 to

53.7. Fifty percent of participants were operators, 22.7% were maintenance, and 27.3% were administration/clerical staff. Seventy-three percent of participants were married, 4% had never been married, and 23% were divorced. Seventy-seven percent of participants were full-time employees while 23% were part-time employees. Thirty-two percent were non-smokers, 27% were smokers, and 41% were former smokers. Nine percent earned $15,000 – 29,999, 14% earned $30,000 – 44,999, 18% earned $45,000 – 59,999, 23% earned $60,000 - 74,999, 14% earned percent earned $75,000-89,999, 9% earned $90,000 and above, and 13 percent chose not to answer. Fourteen percent earned a bachelor's degree, 32% had a vocational/technical school degree, and 54% had a high school degree. Five percent reported being diagnosed with heart disease, 32% with high blood pressure, 23% with arthritis, and 14% with diabetes. Nine percent self-reported their stress level as rarely, 50% as occasionally, 32% as frequently, and 9% as constantly.

Tailoring

Tailoring of the ALED intervention for the Phase 2 participants was done based on focus group feedback from Phase 1 participants using the NGT. The most significant finding from the focus group was to tailor the more general examples from the ALED curriculum to the mass transit population. For example, one of the examples in Session 4 of the program (Session 7 in the original ALED curriculum), discusses how to deal with physical activity relapses when things at work are hectic. One participant stated "You've discussed how to fit physical activity in when it's crazy at work but that's how it always is here." Participants suggested using examples given in the original curriculum, but also discussing examples specific to this population, such as lapsing because of being "required" to work overtime.

Focus group feedback also suggested eliminating the amount of paperwork given to each participant. One participant stated, "Like I've said, we work in transportation, we keep moving. And the paper just keeps cluttering it up. It's not important to us. We need something small we can take with us and go. Something we can keep with us to remind us." Other participants agreed with this statement. Based on this feedback, the researcher opted to make some of the handouts optional and allowed participants to do life assignments (e.g., setting short-term goals) on note cards, thus enabling participants to take these cards with them throughout the day.

Observations from the focus groups resulted in a tailored ALED curriculum that provided specific examples, life assignments, and feedback to participants that were targeted and relevant to the mass transit population. Additionally, class discussions focused primarily on the issues faced exclusively by mass transit employees.

Reasons for Enrolling in ALED

Participants in Phase 1 and Phase 2 of the intervention had a variety of reasons for deciding to enroll in the ALED program. For many participants in both phases, joining the program was a way to help them learn more about their health and thus improve it. Many were worried how their years at CUMTD had negatively affected their health. One participant stated, "I've been with MTD for 12 years now and there's been a real physical decline in my health the longer I've been here." For a majority of individuals in Phase 2, enrolling in the ALED program at CUMTD was another component of their New Year's resolution. One participant stated, "Our goal was to get more physical activity and in better shape this year. We're hoping this class will help us with that." Other participants decided to participate in the program at the urging of someone else, whether a family member, friend, or physician. Others decided to enroll in the program to learn more about weight management and how to deal with weight issues, especially

in such a sedentary job. One individual claimed, "I've gained about 10 pounds a year since I've worked for MTD. It's just part of the job. You see guys in here all the time who come in looking good and fit but within a few years, that's gone." Employees' also enrolled in the ALED program to learn more about physical activity and how it can affect their stress and fatigue levels. Many employees reported feeling stressed while at work and eventually taking the stress home with them to their families. As one individual mentioned, "I'm stressed all the time and I know I take it home to my family. It just isn't good but what choice do I have." Others were concerned about fatigue levels and hoped engaging in regular physical activity would help relieve those concerns.

Barriers to Physical Activity

CUMTD employees faced unique barriers to becoming and remaining physically active. Significant barriers included changing work schedules, poor weather conditions (e.g., Blizzard of 2011), lack of scheduled and timely breaks, and lack of options for being physically active during routes. These findings are consistent with those of Ragland, Krause, Greiner, and Fisher (1998) and French (2005). For the second phase of the intervention, the Blizzard of 2011 posed significant barriers to becoming and remaining physically active. Some CUMTD employees were required to spend the night at the bus garages due to the inclement weather and the administration's decision to continue routes on February 1, 2011. One participant stated, "Some of us had to stay here overnight. Who wants to do anything when you're stuck here, away from your home, knowing you've got to go out there and face that garbage the next day." For many individuals, the biggest barriers were time and work schedules. One participant mentioned, "You want to go do something but it's hard to find time when you're being called in to work overtime." For a significant portion of the participants, overtime was not something they were

able to give up, whether it was for attending an ALED class or finding time to schedule physical activity. Many employees were unable to give up overtime because of financial reasons; employees could make anywhere from $10,000 - $20,000 extra each year just from overtime. Additionally, it was reported during class sessions that CUMTD employees believed CUMTD to have an unwritten policy regarding overtime. According to one participant, "Sometimes if you say no to the overtime, they won't ask you again for a while. Just to punish you." The statement was corroborated by several other participants who perceived punitive actions by CUMTD for refusing to work overtime. Another significant barrier to this population was the work schedule itself. For the operators, due to the nature of the job, there are few breaks built into the schedule. Even with the breaks built into the schedule, the busses are often running behind so many times, drivers do not take those breaks. Many of the drivers in the study agreed, noting that while administration may see the breaks built into the schedules, the reality is many of these operators do not take these breaks because of the demands of the job. As one participant stated, "The breaks are in there – but it's all on paper. Hardly any drivers get those breaks because we're being forced to do more with less. We're expanding routes, changing our speeds for safety reasons, and increasing ridership. So yeah, we have breaks but we never get them, or if we do, it's 30 seconds or 1 minute, nothing significant." As one can see, CUMTD employees have the challenge of overcoming these unique barriers to becoming and remaining physically active while remaining committed to their jobs.

For Phase 2, for some participants, one of the most significant barriers to obtaining physical activity and seeing any meaningful changes in health outcomes was the Blizzard of 2011. The Blizzard of 2011 occurred after Central Illinois had experienced several nasty winter storms, filled with cold temperatures, record-setting snowfalls, and dangerous ice. Because

CUMTD requires its employees to show up for work at their scheduled time, regardless of weather conditions, numerous employees spent the night at MTD headquarters because they were fearful they would not be able to travel safely home and return back to MTD. Employees spent the night on cots in a large room and were required to shower at MTD facilities, without any of the comforts of one's home. Additionally, despite the fact the University of Illinois (perhaps the largest user of MTD services) had cancelled classes, MTD was still open, with merely a delayed start – running busses at 9 am. Even though the University of Illinois had cancelled classes, nearly 20,000 individuals rode the busses that day. Also, many of the side roads were actually cleared by MTD maintenance employees, who cleared roads and bus shelters, in advance of city and county road crews. Operators stated the storms overextended their bodies' limits and it was difficult just to finish a shift because of the mental and physical fatigue experienced during the shift. Many employees, also, felt pressured to stay later or come in earlier to help with the additional work load (increase in busses on the road or clearing of snow and ice from bus shelters), but many individuals felt exhausted by the end of their shift and could not fathom working any longer. The blizzard also caused significant amounts of stress for employees. One individual stated, "The storm really just stressed me out. I was getting pressure from my bosses and the public. The stress at work causes so much fatigue, you're tired all the time and you just want to shut down." Another individual recognized being more tired than usual because of the snow and ice. The individual stated, "I'm driving even more carefully than before. Imagine trying to control your car during an ice storm and multiple that by 10 – that's what I'm doing. I'm just mentally drained when I get off the bus." Following the Blizzard of 2011 (February 1, 2011) was another terrible winter snow, which occurred February 5, 2011. Weather forecasts had predicted just a dusting of snow, but in actuality, over six inches of snow

fell during that time. The brutality of the winter storms greatly affected participants' abilities to become physically active, their fatigue levels, and their stress levels.

Stages of Change

The Transtheoretical Model was the theoretical basis for the ALED intervention. In Phase 1, of the seven participants who completed the study, five of them moved forward in the stages of change, while two remained at their initial stage. In Phase 2, of the 19 participants who completed the study, 11 moved forward in the stages of change, while 8 remained at their initial stage. Of the 8 who remained at their initial stage, 4 were already in the action or maintenance stages. In both phases, no participants regressed in their stages of change. Even if a participant did not move forward in the stages of change continuum, these individuals did report thinking more about physical activity and reframing their attitudes toward physical activity. One individual stated, "I've learned a lot from this class. Most importantly, I've learned to re-think what counts as physical activity. I never knew walking my dog or playing with my kids counted. That's made a difference in the way I think."

Physical Activity Changes

One of the aims of this study was to examine the impact of an existing, evidence-based physical activity behavior change program in creating changes in physical activity behaviors. Physical activity behavior was assessed by using accelerometers. Participants in both phases were asked to wear an Actigraph accelerometer for 7 days prior to the start of the intervention and for 7 days after Week 6 of the intervention. Activity was categorized as light, moderate, hard, and very hard, with these categories being pre-determined by the Actigraph software. In Phase 1, average pre-intervention light physical activity were 16.5 ± 4.32 $min \cdot hr^{-1}$. Post-intervention, average light physical activity increased slightly to 19.8 ± 15.15 $min \cdot hr^{-1}$, but the

difference was not significant [$F(1, 6) = 0.31$, $p = .60$, partial $\eta^2 = 0.05$]. For Phase 2, the average pre-intervention light physical activity was 20.53 ± 10.67 min·hr^{-1}, whereas post-intervention average light physical activity decreased slightly to 16.04 ± 8.76 min·hr^{-1}, For the Phase 2 data, there was no significant change in light physical activity levels from pre- to post-intervention [$F(1, 18) = 1.52$, $p = .23$, partial $\eta^2 = 0.09$]. A comparison of post-intervention light physical activity from Phase 1 to Phase 2 revealed no significant difference in the two Phases [$t(22) = 0.77$ $p = .45$].

For Phase 1, the average pre-intervention moderate-intensity physical activity was 0.88 ± 0.56 min·hr^{-1} compared to 0.76 ± 0.54 min·hr^{-1} post-intervention. There was no significant change from pre- to post-intervention [$F(1, 6) = 0.13$, $p = .73$, partial $\eta^2 = 0.02$]. In Phase 2, the average pre-intervention moderate-intensity physical activity was1.65 ± 1.65 min·hr^{-1} compared to 1.50 ± 1.64 min·hr^{-1} at post-intervention. As with Phase 1, there was no significant difference from pre- to post-intervention [$F(1, 17) = 2.03$, $p = .17$, partial $\eta^2 = 0.11$]. Comparing the non-tailored version of ALED (i.e., Phase 1) to the tailored version (Phase 2), there was no significant difference in amount of moderate-intensity physical activity [$t(22) = -1.17$, $p = .11$].

For the purpose of this study, minutes of hard, or vigorous, intensity physical activity and very hard, or very vigorous, intensity physical activity were combined for analytic purposes. In Phase 1, the average pre-intervention vigorous/very vigorous physical activity was 0.027 ± 0.06 min·hr^{-1} and the average post-intervention was 0.012 ± 0.023 min·hr^{-1}. There was no significant change in vigorous/very vigorous physical activity from pre- to post-intervention [$F(1, 6) = 1.50$, $p = .27$, partial $\eta^2 = 0.20$)]. For Phase 2, the average pre-intervention vigorous/very vigorous physical activity was 0.11 ± 0.18 min·hr^{-1}, while the average at post-intervention was 4.88 ± 8.26 min·hr^{-1}. There was not a significant change from pre- to post-intervention [F (, 17) = 0.95, p =

.34, partial η^2= 0.06]. As with the previous analyses, there was no significant difference between Phase 1 and Phase 2 for post-intervention amount of vigorous/very vigorous intensity physical activity [$t(22) = -0.64$, $p = .53$].

Decisional Balance

The Decisional Balance Measure (Marcus, Rakowski, & Rossi, 1992) is intended to assess an individual's ratio of perceived benefits of change to barriers of change. When used in the physical activity setting, decisional balance refers to an individual's perceived benefits of physical activity compared to their perceived barriers to physical activity. An individual's differences in decisional balance usually correlate to the stages of change.

In Phase 1, the mean pre-intervention decisional balance score was 1.47 ± 1.19 while the mean post-intervention decisional balance score was 2.04 ± 0.57. A repeated measures analysis of variance (RM-ANOVA) revealed no significant difference from pre- to post-intervention [$F(1, 6) = 1.495$, $p = .27$, partial $\eta^2 = .20$]. Although no significance was shown based on the Decisional Balance Measure, participants did report increasing their perceived benefits of physical activity. One participant stated, "I might not be doing as much physical activity as I wanted to do but I definitely think about it more. I'm still walking most workdays at 10 am and 3 pm, which I think make a difference in the way I work. I used to think I was too busy to take 2 minutes to myself but now I'm a better employee because I do take the time to do it." Another stated, "My co-worker and I have both noticed we have more energy and we're better focused when we've gone on our walks….We don't tend to make silly mistakes because our heads are clear." Other individuals corroborated this statement saying they were finding more and more reasons to either want to become more physically active or stay physically active. All of the

participants in Phase 1 believed learning about personal benefits to physical activity was very important to helping them become and remain physically active.

For Phase 2, the pre-intervention mean decisional balance was 0.92 ± 1.24 while the post-intervention mean decisional balance was 1.67 ± 1.11. The RM-ANOVA revealed a significant increase in decisional balance from pre- to post-intervention [$F(1, 18) = 5.62$, $p = .029$, partial $\eta^2 = .24$]. Participants also reported gaining more benefits to physical activity as the intervention progressed. One participant reported, "This has helped me have more energy." Another participant stated, "I know if I do it that I'll have more energy." When comparing Phase 1 (non-tailored) to Phase 2 (tailored), there was no significant difference in the post-intervention results from Phase 1 to the post-intervention results from Phase 2 [$t(24)=0.84$, $p = .410$]. Sixteen of the participants stated learning about personal benefits of physical activity was a meaningful exercise, which encouraged them to become and remain physically active

Processes of Change

Processes of change refer to the cognitive and behavioral strategies individuals use when making a behavior change and progressing through the stages of change. The cognitive processes of change are: 1) increasing knowledge; 2) being aware of risks; 3) caring about consequences to others; 4) comprehending benefits; and 5) increasing healthy opportunities. The behavioral processes are: 1) substituting alternatives; 2) enlisting social support; 3) rewarding oneself; 4) committing oneself; and 5) reminding oneself.

For Phase 1, four of the 10 processes of change demonstrated significant changes from pre-intervention to post-intervention (see Table 5 and Table 6). An overall multivariate analysis of variance (MANOVA) for the cognitive processes did not result in a significant time effect [Hotelling's $T^2=8.39$, $F(5, 2)=3.36$, $p= .25$], but the analysis was clearly underpowered with only

seven subjects. Separate RM-ANOVAs were run for each of the cognitive processes. Significant changes were seen in caring about consequences for others [$F(1, 6)=5.56$, $p= .05$, partial $\eta^2= .48$], increasing healthy opportunities [$F(1, 6)=16.62$, $p= .007$, partial $\eta^2= .74$], and increasing knowledge approached significance [$F(1, 6)=4.89$, $p= .07$, partial $\eta^2= .45$]. Five of the participants believed replacing sedentary activities with active ones were very important while two believed it was somewhat important. As seen in Table 5, caring about consequences and increasing healthy opportunities had fairly sizable effect sizes (both $d_s= 0.88$), while the effect size for increasing knowledge was only slightly smaller ($d=0.81$). As with the cognitive processes, an overall MANOVA for the behavioral processes did not result in a significant time effect [Hotelling's $T^2=13.095$, $F(5, 2)=5.24$, $p= .17$], but the analysis was clearly underpowered with only seven subjects. Separate RM-ANOVAs were run for each of the behavioral processes. Significant changes were seen in committing oneself [$F(1, 6)=17.93$, $p= .005$, partial $\eta^2= .75$, $d=1.05$], and reminding oneself [$F(1, 6)=6.49$, $p= .044$, partial $\eta^2= .52$, $d=0.89$]. The process of change of rewarding oneself approached significance ($p = .09$), but did not make it at the $p < .05$ level in spite of having the largest effect size ($d=1.19$). Five of the seven participants believed, however, that rewarding oneself for engaging in physical activity was very important in providing motivation to complete physical activity. Despite not any statistically significant changes in the enlisting social support process ($p=.11$), statements made by participants demonstrate enlistment of social support. Four individuals believed support was very important while two believe it was somewhat important. One participant stated, "My co-worker has been really supportive of me, reminding me when to go for a walk." This participant also noted taking walks with the co-worker fairly regularly at 10 am and 3 pm. Another participant mentioned, "Social support is really important to me. I wouldn't go on the walks or do the Fitness Center if

I didn't have someone encouraging me." Additionally, no statistically significant change was demonstrated for the process of "being aware of risks." One participant mentioned, "Your class helped me realize I needed to do something. My family depends on me and if I can't work, what would happen to them?"

Again, for Phase 2, an overall MANOVA for the cognitive processes did not result in a significant time effect [Hotelling's T^2=0.60, F(5, 14)=1.69, p= .20], but the analysis was still underpowered with 19 subjects. Separate RM-ANOVAs were run for each of the cognitive processes. Significant changes were seen only for increasing healthy opportunities [F(1, 18)=9.86, p= .006, partial η^2= .35, d=0.88]; caring about consequences approached significance [F(1, 18)=3.30, p= .09, partial η^2= .16, d=0.53] as did comprehending benefits [F(1, 18)=3.49, p= .08, partial η^2= .16, d=0.51]. Thirteen participants found that replacing sedentary behaviors was very important step to take and four believed it was somewhat important. There were not any statistically significant changes in the processes of "increasing knowledge" or "comprehending benefits." Participants, however, mentioned remembering information given to them by the facilitator about the benefits of physical activity that were relevant to them. One participant reported, "I'm focusing on other ways to fit in physical activity that are different from just going to the Fitness Center." Participants also reported seeking out and reading articles about physical activity to better understand and learn more about it. One participant stated:

> Between what you've said and the stuff you've given us to read and some of the stuff I'm looking at, I'm seeing if you don't keep your body moving, the body shuts down. I'm seeing it here where guys in their 40s and 50s can't do as much as they were doing in their 20s and 30s because they don't do things to prevent injury and the body shuts down.

Another individual stated, “I liked how you talked about what issues bus drivers specifically face – having the knowledge was important.” Participants demonstrated a change in “comprehending benefits” by thinking about how physical activity would change their physical and mental health. One individual mentioned, “I know I would feel better about myself if I just lost some of this weight.” Yet another spoke about how physical activity would affect joint issues, “I’ve had problems with my knees and hips and I know a lot of it would be taken care of if I exercised more.” This statement was corroborated by another individual who reported, “I realizing if I exercised more and did different things, perhaps my back wouldn’t hurt so much at the end of the day. I’d be a happier person, for sure.”

An overall MANOVA for the behavioral processes did not result in a significant time effect [Hotelling’s T^2=0.51, F(5, 14)=1.42, p= .28], but the analysis was still underpowered with 19 subjects (observed power = .36). Separate RM-ANOVAs were run for each of the behavioral processes. Significant changes were seen only for substituting alternatives [F(1, 18)=6.89, p= .017, partial η^2= .28, d=0.59]; reminding oneself [F(1, 18)=5.25, p= .034, partial η^2= .23, d=0.59], and rewarding oneself [F(1, 18)=4.83, p= .041, partial η^2= .21, d=0.60]. For Phase 1, the mean post-intervention score was 2.18 ± 1.04 while for Phase 2, the mean post-intervention score was 3.21 ± 0.86. Comparing the post-intervention results from Phase 1 to Phase 2, there is only one process of change that demonstrated any significant difference: increasing healthy opportunities [t(24) = -2.68, p = .01].

Self-Efficacy

Self-efficacy refers to an individual’s belief in his or her ability to succeed in a particular situation (Bandura, 1977). Self-efficacy was measured using an instrument developed by Marcus, Selby, Niaura, and Rossi (1992). The 5-question instrument is measured from 1 (not at

all confident to 5 (extremely confident). For Phase 1, the mean pre-intervention self-efficacy was 2.72 ± 0.83 while the post-intervention self-efficacy increased to 3.40 ± 1.00, showing participants become more confident about their ability to become more physically active as the intervention progressed. There was no significant difference in self-efficacy from the beginning of the intervention [$F(1, 6) = 1.80$, $p = .23$, partial $\eta^2 = 0.23$, $d=0.74$]. Despite the lack of statistical significance to demonstrate an increase in self-efficacy among participants, qualitative data corroborated the sizable effect size for the increased self-efficacy. One participant mentioned previous failures to becoming physically active, but then mentioned gaining confidence in the last six weeks to become physically active. In the tailored version of the program, the mean pre-intervention self-efficacy was 2.9 ± 0.80 while the mean post-intervention self-efficacy was 3.3 ± 0.71. As in non-tailored version of the program, there was no significant difference in self-efficacy from the start to the end of the intervention [$F(1, 18) = 2.52$, $p = .13$, partial $\eta^2 = 0.12$, $d=0.53$]. One participant in the tailored version of the program mentioned, "I've got more confident in climbing up and down my stairs." Another stated, "I've gained confidence in myself to continue being physically active. I know I've got the skills now to do it. It's just up to me now." Others believed setting appropriate short-term and long-term goals helped them achieve the confidence needed to become and remain physically active. One individual stated, "Meeting every week has helped me stay accountable and stay on track. I've had extra motivation to meet my short-term goals because I know we're going to talk about it every week." There were no significant differences in endpoint values of self-efficacy when comparing the non-tailored version (Phase 1) to the tailored one (Phase 2) [$t(24) = 0.38$), $p = .71$].

Physical and Mental Health

Physical and mental health was assessed using the SF-36 (Ware, Kemp, Buchner, Singer, Nolop, & Goss, 1998). The SF-36 is a short form health survey with 36 questions that measures 8 facets of health: physical function, physical role, body pain, general health, vitality, social functioning, emotional role, mental health, and reported health. These 8 facets are broken into two dimensions, physical health status and mental health status, which are then compiled to give a total SF-36 score. Scores range from 0 to 100, with a score of 100 correlating with very good health while a score of 0 correlates with very bad health.

In the non-tailored version of ALED, the pre-intervention mean was 74.86 ± 16.7 while the post-intervention mean was 73.57 ± 20.00. There was also no significant change from pre-intervention scores to post-interventions ones (p = .89). An overall multivariate analysis of variance (MANOVA) for the physical health dimensions did not result in a significant time effect [Hotelling's T^2=1.29, $F(4, 3) = 3.36$, p= 0.53] , nor did a MANOVA for the mental health dimensions [Hotelling's T^2=0.93, $F(4, 3) = 0.75$, p= 0.62]. Looking at each dimension of the SF-36 individually, there were no significant changes in any of these dimensions from pre-intervention to post-intervention, either. Separate RM-ANOVAs were run for each of the physical health dimensions and mental health dimensions, but again, there were no significant changes for any of the facets (all p_s> .20), which reinforces the small changes seen in Table 7.

In the tailored version of ALED, the pre-intervention mean was 75.26 ± 16.70 and the post-intervention mean was 82.26 ± 11.00 (d=0.51). From pre-intervention to post-intervention, there was a significant change in the two values from the SF-36 ($F(1, 18) = 6.24$, p = .02, partial η^2= 0.26). An overall multivariate analysis of variance (MANOVA) for the physical health dimensions did not result in a significant time effect [Hotelling's T^2=0.49, $F(4, 15) = 1.83$, p= 0.18]. A MANOVA for the mental health dimensions did not result in a significant time effect

either, but did approach significance [Hotelling's T^2=0.70, $F(4, 15) = 2.61$, p= 0.08]. Separate RM-ANOVAs were run for each of the physical health dimensions and mental health dimensions. Means and standard deviations for physical and mental health dimensions are found in Table 8. For the general health dimension, there was a significant difference from pre-intervention to post-intervention [$F(1, 18) = 8.61$, $p = 0.01$, partial η^2= 0.32, d=0.51]. For the mental health component, the vitality dimension demonstrated a significant increase from pre- to post intervention [$F(1, 18) = 9.27$, $p = 0.01$, partial η^2= 0.34, d=0.68] and social functioning approached significance [$F(1,18) = 3.84$, $p = 0.07$, partial η^2= 0.18, d=0.58]. The mental health component increased significantly from pre- to post intervention [$F(1, 18) = 10.28$, $p = 0.01$, partial η^2= 0.36, d=0.78]. These findings are corroborated by statements made by participants during the program. One participant stated "Now I have a better mental focus." Another mentioned, "I feel better physically and mentally, and I have a better attitude." Another participant stated, "I want to visit family and do things now." Comparing the post-intervention mean overall scores from the non-tailored version to the tailored version, however, demonstrates no significant differences between the two post-intervention groups [$t(24) = 0.17$, $p = .17$]. When one compares each dimension individually, there is a significant difference from the non-tailored version to the tailored version in the dimension of emotional role [$t(24) = -2.31$, p = 0.03.

Fatigue

Fatigue is an important issue faced by mass transit workers. It is particularly important with this population because severe fatigue can lead to serious accidents and safety issues. One individual stated, "It is a bad cycle to get into. I'm tired when I get off work but I'm too keyed up to sleep so then I don't get sleep so then I'm tired when I go to work again. Many of us, if

asked by management, would deny we are tired. But we are." Fatigue was measured using the MFI (Smets, Garssen, Bonke, & De Haes, 1995). The MFI assesses five dimensions of fatigue: General Fatigue, Physical Fatigue, Mental Fatigue, Reduced Motivation, and Reduced Activity. An overall MANOVA for the non-tailored version of the program revealed no significant time from pre- to post-intervention [Hotelling's T^2=1.02, $F(5, 2) = 0.41$, p= 0.82]. Pre-intervention General Fatigue was 11.71 ± 2.93 while at post-intervention this had dropped slightly to 11.00 ± 2.77 [$F(1, 6) = 0.49$, $p = 0.51$, partial η^2= 0.08, d=0.25]. Pre-intervention Physical Fatigue was 12.29 ± 3.35, but declined to 10.00 ± 3.16 at post-intervention [$F(1, 6) = 2.04$ $p = 0.20$, partial η^2= 0.25, d=0.70]. For the dimension of Mental Fatigue, the mean score at pre-intervention was 7.57 ± 3.41 and remained unchanged at post-intervention 7.71 ± 4.03 [$F(1, 6) = 0.01$, $p = 0.95$, partial η^2= 0.001, d=0.04]. Likewise, Reduced Motivation (pre-intervention: 8.29 ± 2.14; post-intervention: 7.43 ± 2.15) [$F(1, 6) = 1.15$, $p = 0.33$, partial η^2= 0.16, d=0.34] and Reduced Activity(pre-intervention: 10.00 ± 3.51; post-intervention: 9.14 ± 2.19) [$F(1, 6) = 0.27$, p = 0.62, partial η^2= 0.04, d=0.78] did not show any significant changes. This finding is corroborated by statements made by participants. One individual stated, "I'd have more energy to do the things I want to do. I just am so tired when I get home and I can't even enjoy my hobbies."

For the tailored version, the overall MANOVA showed no significant time effect as a result of the intervention [Hotelling's T^2=0.44, $F(5, 14) = 1.22$, p= 0.35]. Separate RM-ANOVAs showed that only the Reduced Motivation dimension had a significant decline [pre-intervention: 9.32 ± 2.38; post-intervention: 7.74 ± 2.16, $F(1, 18) = 6.06$, p =.024, partial η^2= 0.25, d=0.70]. No significant changes were seen for: General Fatigue [pre-intervention: 11.16 ± 3.79; post-intervention: 10.60 ± 3.10, $F(1, 18) = 0.43$, p =.52, partial η^2= 0.02, d=0.15], Physical

Fatigue [pre-intervention: 7.26 ± 2.58; post-intervention: 6.37 ± 2.06 [$F(1, 18) = 2.98$, $p = 0.10$, partial $\eta^2 = 0.14$, $d = 0.38$],Mental Fatigue [pre-intervention: 9.89 ± 3.59; post-intervention:9.32 ± 2.93 [$F(1, 18) = 0.50$, $p = 0.49$, partial $\eta^2 = 0.03$, $d = 0.17$], or Reduced Activity [pre-intervention: 9.79 ± 4.39; post-intervention:8.53 ± 2.72, $F(1, 18) = 2.85$, $p = 0.11$, partial $\eta^2 = 0.14$, $d = 0.35$]. One individual discussed how there was interest in doing things after work now because of the reduced tiredness felt after a long shift. This individual stated, "I am enjoying life more now. I'm not so worn out some nights after I've worked." There were no significant differences in mean post-intervention scores for General Fatigue [$t(24) = 0.28$, $p = 0.79$], Mental Fatigue [$t(24) = -1.12$, $p = 0.27$], Reduced Motivation [$t(24) = -0.32$, $p = 0.75$], or Reduced Activity [$t(24) = 0.54$, $p = 0.60$] when comparing the non-tailored to the tailored version of the program. There was, however, a significant difference in Physical Fatigue [$t(24) = 3.45$, $p = .002$] between the two intervention groups (Phase 1: 10.00 ± 3.16 versus Phase 2: 6.37 ± 2.06), which indicates significantly less Physical Fatigue following the tailored intervention.

Sleep Quality

Sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI; Buysse, Reynolds, Monk, Berman, & Kupfer, 1989). The PSQI is a self-reported measure of one's quality of sleep, assessing sleep quality and disturbances over a one-month period. The 19-question instrument assesses seven dimensions of self-reported sleep quality: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. These seven dimensions compile an individual's global sleep quality score. A higher score is indicative of poorer sleep quality. In Phase 1 of the study, the mean pre-intervention PSQI was 6.43 ± 3.4 while the post PSQI was 5.71 ±4.8, which was not a significant change from pre- to post-intervention [$F(1, 6) = 0.08$), $p = .79$,

partial η^2= 0.01, *d*=0.17]. In Phase 2 of the study, the mean pre-intervention PSQI was 6.84 ± 4.3 and post PSQI was 4.37 ± 3.0, which was a significant reduction in the PSQI (i.e., increase in sleep quality) as a result of the intervention [$F(1, 18) = 10.64$, $p = .004$, partial η^2= 0.37, *d*=0.68]. One individual remarked, "I am sleeping better, which makes everything better." Another individual stated, "I'm sleeping better and actually eating more regular meals." Comparing the non-tailored version to the tailored version, however, there was no significant difference between the two [$t(24) = 0.86$, $p = .40$].

Perceived Stress

Perceived stress was measured using the Perceived Stress Scale (PSS; Cohen & Williamson, 1988). The PSS is commonly used to assess how stressful an individual finds situations in his/her life over the period of the last month. Scores on the PSS can range from 0 to 40. The higher the score on the PSS, the higher the individual's perceived stress. In Phase 1, pre-intervention mean PSS was 15.14 ± 7.4; the post-intervention mean score was 13.0 ± 5.8. There was, however, no significant change from pre- to post-intervention [$F(1, 6) = 0.48$, $p = .51$, partial η^2= 0.07, *d*=0.32]. One individual stated, "This class has helped me learn more about how being physically active can help me manage my stress better. I know it'll make a big difference for me and my family." For Phase 2, the mean pre-intervention PSS score was 14.37 ± 5.6; the mean post-intervention PSS score was 10.11 ± 4.8. For Phase 2, there was a significant reduction in perceived stress from pre- to post-intervention [$F(1, 18) = 11.23$, $p = .004$, partial η^2= 0.38, *d*=0.43]. One participant stated, "The stress techniques are things I can use when I'm driving. It takes just a few seconds but it is enough." Another individual remarked, "Changing routes can be nuts like when they changed the orange into the red and it can be stressful but I think being physically active will help me when those stresses that come

up." Comparing Phase 1 post-intervention PSS scores to Phase 2 post-intervention PSS scores, there was no significant difference in means between these two phases [$t(24) = 1.29$, $p = .21$].

Activities of Daily Living

Activities of daily living refers to actions people take throughout the course of a normal day. These activities include things like kneeling, reaching over one's head, walking several blocks, and climbing out of a tub. This instrument (McDowell & Newell, 1996) has 20 questions and is scored on a Likert scale from 1 ("Cannot Do") to 7 ("Can Do Easily"), with scores ranging from 20 – 140. For Phase 1, the mean pre-intervention score was 133.43 ± 7.3 and the post-intervention score was 134.71 ± 5.7, with no significant change from pre- to post-intervention [$F(1, 6) = 0.623$, $p = .46$, partial $\eta^2 = 0.09$, d=0.20). One individual did note it was easier to play with the grandchildren on the floor after becoming physically active. In Phase 2, the mean pre-intervention score was 129.95 ± 14.93 with a mean post-intervention score of 130.53 ± 16.23. Based on the RM-ANOVA, there was no significant change from pre-intervention to post-intervention [$F(1, 18) = 0.31$, $p = .59$, partial $\eta^2 = 0.02$, d=0.04]. Another individual remarked "Before it was a chore to go up and down the stairs and now it's something I don't think about." When comparing post-intervention results in Phase 1 to those in Phase 2, there was also no significant differences in those results [$t(24) = 0.66$), $p = .52$).

Participants' Feelings During Physical Activity

The Feeling Scale (FS) is a scale developed by Hardy and Rejeski (1989) to assess an individual's affective state while engaging in exercise. The scale ranges from -5 ("Very Bad") to 0 ("Neutral") to +5 ("Very Good"). In Phase 1, the mean pre-intervention score was 1.29 ± 1.70 while the mean post-intervention score was 2.85 ± 1.35, not a significant increase from pre- to post-intervention [$F(1, 6) = 2.75$, $p = .15$, partial $\eta^2 = 0.31$, d=1.02). This was a sizable effect,

however, indicating a lack of statistical power (observed power=0.29). Qualitatively, one individual noted, "As I am more physically active, I enjoy how it gets my blood flowing." In Phase 2, the mean pre-intervention FS score was 0.21 ± 1.9 while the mean post-intervention score was 2.80 ± 1.4. Based on the RM-ANOVA, there was a significant increase in positive affect during exercise from pre- to post-intervention [$F(1, 18) = 20.20$, $p = .001$, partial $\eta^2 = 0.53$, d=1.57]. As one participant remarked, "I'm more psyched about physical activity. I can't wait to do it." Another individual stated, "I walk out happier than I walked in." Comparing the post-intervention scores from the non-tailored version to the tailored version, however, demonstrated no significant differences [$t(24) = 0.11$ $p = .92$], indicating that both versions of the program resulted in participants feeling better during exercise at the end of the program.

Physical Activity Enjoyment

Physical activity enjoyment was measured using the Physical Activity Enjoyment Scale (PACES). The PACES, developed by Kendzierski and Carlo (1991), is an 18-item questionnaire that assesses an individual's level of enjoyment about the physical activity they have just completed. In the first phase of the study, the non-tailored group had an average pre-intervention physical activity enjoyment score of 48.0 ± 9.1 while the average post-intervention score was 59.3 ± 14.5. There was no significant difference from pre- to post-intervention [$F(1, 6) = 2.95$, $p = .14$, partial $\eta^2 = 0.33$, d=0.96]. Once again, this large effect size indicates the lack of statistical power (observed power=0.31). One participant mentioned, "It's not so hard to do it anymore. At the beginning, those 2 minute walks seemed long and we're surprised at how fast it goes. I'm actually starting to enjoy it a little more now." For the tailored intervention group, the mean pre-intervention PACES score was 43.8 ± 14.5 while the mean post-intervention score was 58.6 ± 8.5. There was a significant difference from pre- to post-intervention [$F(1, 18) = 14.28$, $p =$

.001, partial η^2= 0.44, *d*=1.29, observed power=0.95]. One participant stated, "Once I get out there, it's so cool." Another individual stated, "The more I exercise, the happier I feel." Yet another individual was quoted as saying, "This has changed my way of thinking: it takes physical activity and turns it from something negative and unpleasant into something positive and pleasant." Another individual mentions, "I find it challenging, in a good way, because it physically pushes you to the next level." Based on an independent samples *t*-test, however, there was no significant difference in the mean post-intervention PACES scores of Phase 1 compared to the mean post-intervention PACES score of Phase 2 [$t(24) = 0.15$), $p = 0.88$). This further illustrates the lack of power in the first intervention: participants in booth interventions were reporting the same level of enjoyment at the end of the program, but there simply were not enough participants in the first Phase to yield a significant increase.

Figure 1

Phase 1 Consort Diagram

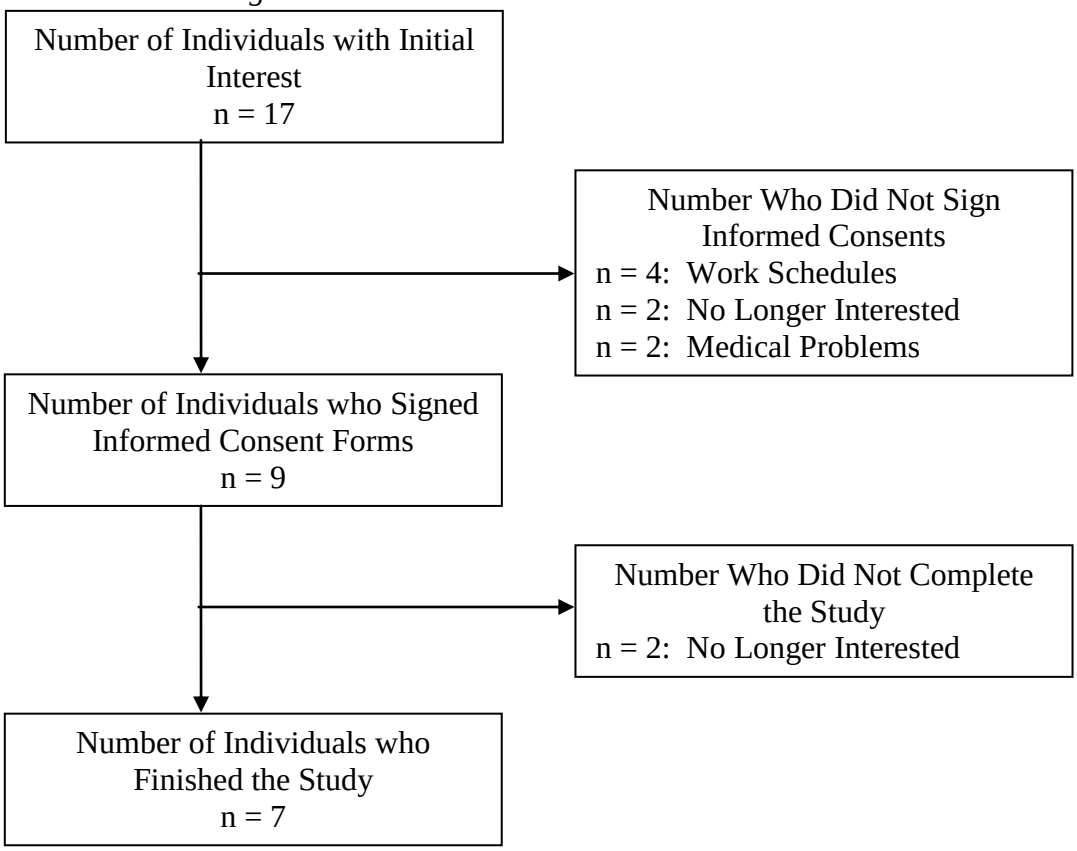

Figure 1 represents participant recruitment and retention for Phase 1.

Figure 2

Phase 2 Consort Diagram

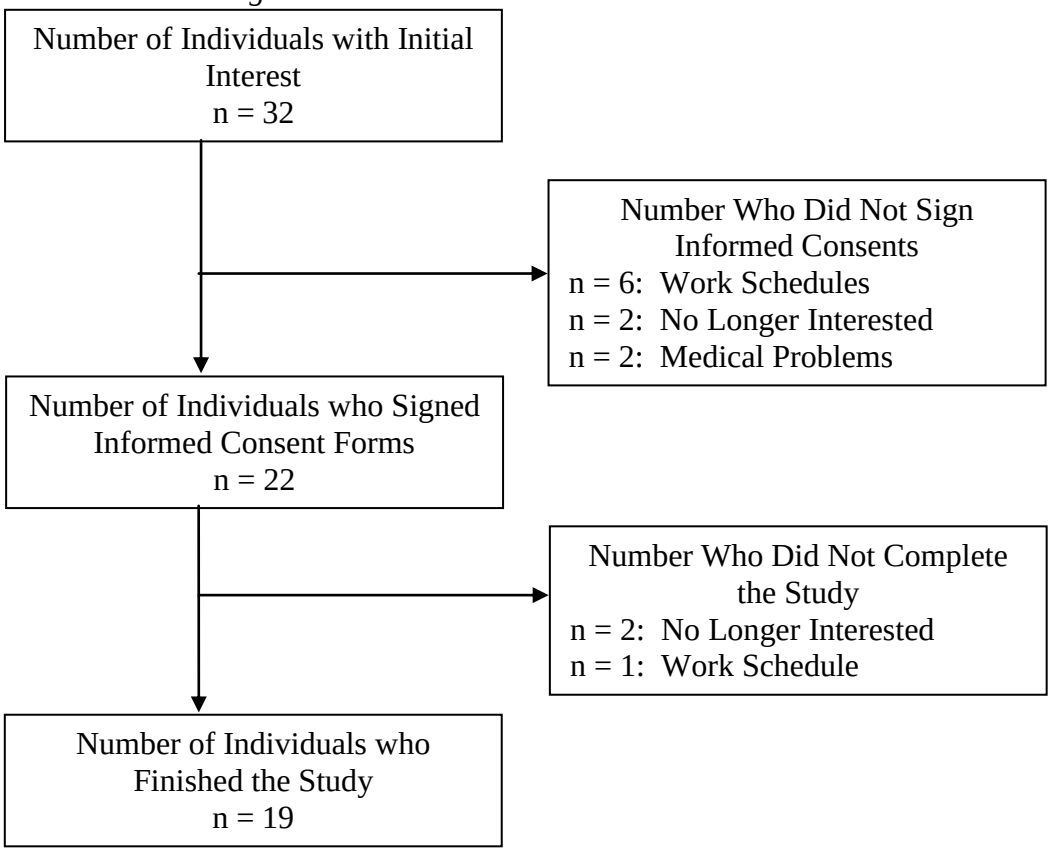

Figure 2 represents participant recruitment and retention for Phase 2.

Table 1

Demographics for Phase 1

Measure		Percentage	Mean	SD	Range
Gender					
	Males	22%	N/A	N/A	N/A
	Females	78%	N/A	N/A	N/A
Age		N/A	47.6	9	35-58
Race					
	Hispanic	11%	N/A	N/A	N/A
	African-American	22%	N/A	N/A	N/A
	Caucasian	67%	N/A	N/A	N/A
Education					
	High School	67%	N/A	N/A	N/A
	Associate's	22%			
	Vocational/Tech	11%			
	Bachelor's	0%			
Occupation					
	Operators	56%	N/A	N/A	N/A
	Maintenance	11%			
	Clerical/Office	33%			
Marital Status	Single	0%	N/A	N/A	N/A
	Married	100%			
	Divorced	0%			
Employment					
	Full-time	89%	N/A	N/A	N/A
	Part-time	11%			
Income					
	No answer	0%	N/A	N/A	N/A
	$15,000-29,999	11%			
	$30,000-44,999	11%			
	$45,000-59,999	11%			
	$60,000-74,999	33%			
	$75,000-89,999	33%			
	$90,000 +	0%			

Table 2

Health Status for Phase 1 Participants

Measure		Percentage	Mean	SD	Range
BMI					
	Underweight	11%	32.5	8.9	17.8-
	Normal	11%			44.3
	Overweight	11%			
	Obese	67%			
Smoking					
	Non-smoker	56%	N/A	N/A	
	Smoker	22%			N/A
	Former smoker	22%			
Heart					
Disease	Yes	0%	N/A	N/A	
	No	100%			N/A
Diabetes					
	Yes	0%	N/A	N/A	
	No	100%			N/A
Hypertension					
	Yes	22%	N/A	N/A	
	No	78%			N/A
Arthritis					
	Yes	22%	N/A	N/A	
	No	78%			N/A
Stress					
	Rarely	0%	N/A	N/A	N/A
	Occasionally	56%			
	Frequently	33%			
	Constantly	11%			

Table 3

Demographics for Phase 2

Measure		Percentage	Mean	SD	Range
Gender					
	Males	59%	N/A	N/A	N/A
	Females	41%	N/A	N/A	N/A
Age		N/A	46.6	11.7	27-72
Race					
	Hispanic	0%	N/A	N/A	N/A
	African-American	9%	N/A	N/A	N/A
	Caucasian	91%	N/A	N/A	N/A
Education					
	High School	54%	N/A	N/A	N/A
	Associate's	0%			
	Vocational/Tech	32%			
	Bachelor's	14%			
Occupation					
	Operators	50%	N/A	N/A	N/A
	Maintenance	23%			
	Clerical/Office	27%			
Marital Status	Single	4%	N/A	N/A	N/A
	Married	73%			
	Divorced	23%			
Employment					
	Full-time	77%	N/A	N/A	N/A
	Part-time	23%			
Income					
	No answer	13%	N/A	N/A	N/A
	$15,000-29,999	9%			
	$30,000-44,999	14%			
	$45,000-59,999	18%			
	$60,000-74,999	23%			
	$75,000-89,999	14%			
	$90,000 +	9%			

Table 4

Health Status for Phase 2 Participants

Measure		Percentage	Mean	SD	Range
BMI					
	Underweight	0%	32.1	1.9	21.6-
	Normal	13%			53.7
	Overweight	32%			
	Obese	55%			
Smoking					
	Non-smoker	32%	N/A	N/A	
	Smoker	27%			N/A
	Former smoker	41%			
Heart					
Disease	Yes	5%	N/A	N/A	
	No	95%			N/A
Diabetes					
	Yes	14%	N/A	N/A	
	No	860%			N/A
Hypertension					
	Yes	32%	N/A	N/A	
	No	68%			N/A
Arthritis					
	Yes	23%	N/A	N/A	
	No	77%			N/A
Stress					
	Rarely	9%	N/A	N/A	N/A
	Occasionally	50%			
	Frequently	32%			
	Constantly	9%			

Table 5

Processes of Change Changes for Phase 1

Phase	Category	Process	Timepoint	Mean	SD	Cohen's *d*
1	Cognitive	Knowledge	Pre	2.86	0.69	0.81
			Post	3.64	1.18	
		Risks	Pre	2.53	1.01	0.57
			Post	3.29	1.60	
		Consequences	Pre	2.57	0.72	0.88
			Post	3.32	0.97	
		Benefits	Pre	3.50	1.07	0.40
			Post	3.92	1.04	
		Opportunities	Pre	2.18	1.04	0.88
			Post	3.04	0.91	
	Behavioral	Alternatives	Pre	2.93	0.66	0.87
			Post	3.54	0.74	
		Social Support	Pre	1.93	1.00	0.80
			Post	2.68	0.86	
		Rewarding	Pre	2.29	0.86	1.19
			Post	3.46	1.09	
		Committing	Pre	3.21	0.77	1.05
			Post	4.18	1.06	
		Reminding	Pre	1.75	0.72	0.89
			Post	2.46	0.87	

Table 6

Processes of Change Changes for Phase 2

Phase	Category	Process	Timepoint	Mean	SD	Cohen's *d*
2	Cognitive	Knowledge	Pre	3.21	1.08	0.45
			Post	3.67	0.96	
		Risks	Pre	2.73	0.96	0.35
			Post	3.13	1.29	
		Consequences	Pre	3.22	0.79	0.53
			Post	3.64	0.80	
		Benefits	Pre	3.72	0.62	0.51
			Post	4.08	0.79	
		Opportunities	Pre	3.21	0.86	0.88
			Post	3.86	0.60	
	Behavioral	Alternatives	Pre	3.28	0.89	0.59
			Post	3.74	0.64	
		Social Support	Pre	2.92	0.94	0.24
			Post	3.14	0.89	
		Rewarding	Pre	3.24	0.70	0.60
			Post	3.64	0.64	
		Committing	Pre	3.86	0.73	0.59
			Post	4.21	0.50	
		Reminding	Pre	2.30	0.98	0.59
			Post	2.78	0.65	

Table 7

Physical and Mental Health Changes for Phase 1

Phase	Category	Dimension	Timepoint	Mean	SD	Cohen's *d*
1	Physical	Physical Function	Pre	92.78	9.39	0.43
			Post	86.43	18.42	
		Physical Role	Pre	83.33	25.00	0.26
			Post	75.00	38.19	
		Body Pain				
			Pre	63.33	29.54	0.34
		General Health	Post	75.00	38.19	
		Overall Physical	Pre	62.00	17.32	0.43
			Post	69.14	15.51	
		Vitality	Pre	72.00	13.87	0.04
			Post	72.57	18.31	
	Mental	Social Functioning	Pre	58.33	15.39	0.91
			Post	65.73	12.72	
		Emotional Role	Pre	82.00	24.18	0.07
			Post	80.43	22.69	
			Pre	85.22	33.77	0.37
			Post	71.43	40.55	
		Mental Health	Pre	73.78	14.85	0.01
			Post	73.71	17.26	
		Overall Mental	Pre	72.22	16.18	0.02
			Post	71.86	16.69	

Table 8

Physical and Mental Health Changes for Phase 2

Phase	Category	Dimension	Timepoint	Mean	SD	Cohen's *d*
2	Physical	Physical Function	Pre	88.42	17.88	0.04
			Post	87.89	25.24	
		Physical Role	Pre	89.47	20.94	0.07
			Post	87.89	25.24	
		Body Pain	Pre	69.79	19.36	0.12
			Post	72.11	18.49	
		General Health	Pre	66.84	19.45	0.51
			Post	76.84	20.00	
		Overall Physical	Pre	73.00	14.39	0.36
			Post	78.05	13.45	
	Mental	Vitality	Pre	50.26	23.66	0.68
			Post	64.21	16.77	
		Social Functioning	Pre	81.74	15.81	0.58
			Post	89.68	11.13	
		Emotional Role	Pre	85.95	30.11	0.38
			Post	94.79	12.36	
		Mental Health	Pre	70.11	18.64	0.78
			Post	81.89	10.53	
		Overall Mental	Pre	70.89	15.98	0.80
			Post	81.53	9.90	

Table 9

Phase 1 Nominal Group Technique Findings – Tailoring of the ALED Intervention

Rankings for Tailoring the ALED Intervention
1. Use examples, life assignments, and feedback specific to the mass transit population
2. Eliminate the amount of paperwork; provide option of completing life assignments on a note card
3. Center class discussions primarily on issues faced specifically by the mass transit population

Table 9 represents the rankings, based on participants' feedback during the Nominal Group Technique focus group, for tailoring the ALED intervention.

Table 10

Phase 1 Nominal Group Technique Findings – Duration of the ALED Intervention

Duration of the ALED Intervention
1. Thought intervention period was too short because were unable to actually put lessons to use
2. Wanted a booster class after 3 months

Table 10 represents Phase 1 participants' feedback regarding the duration of the ALED intervention.

Table 11

Phase 2 Nominal Group Technique Findings – Tailoring of the ALED Intervention

Usefulness of the Tailoring the ALED Intervention
1. Enjoyed discussions and assignments, which pertinent and specific to the mass transit population
2. Discovered the use of note cards helped to keep material at the forefront of individuals' thoughts

Table 11 represents Phase 2 participants' feedback regarding the usefulness of the tailoring of the ALED intervention.

Table 12

Phase 2 Nominal Group Technique Findings – Duration of the ALED Intervention

Duration of the ALED Intervention
1. Believed six weeks did not feel long enough to make changes
2. Requested several refresher courses to be held a few months after the initial intervention

Table 12 represents Phase 2 participants' feedback regarding the appropriateness of the duration of the ALED intervention.

Figure 3

Logic Model

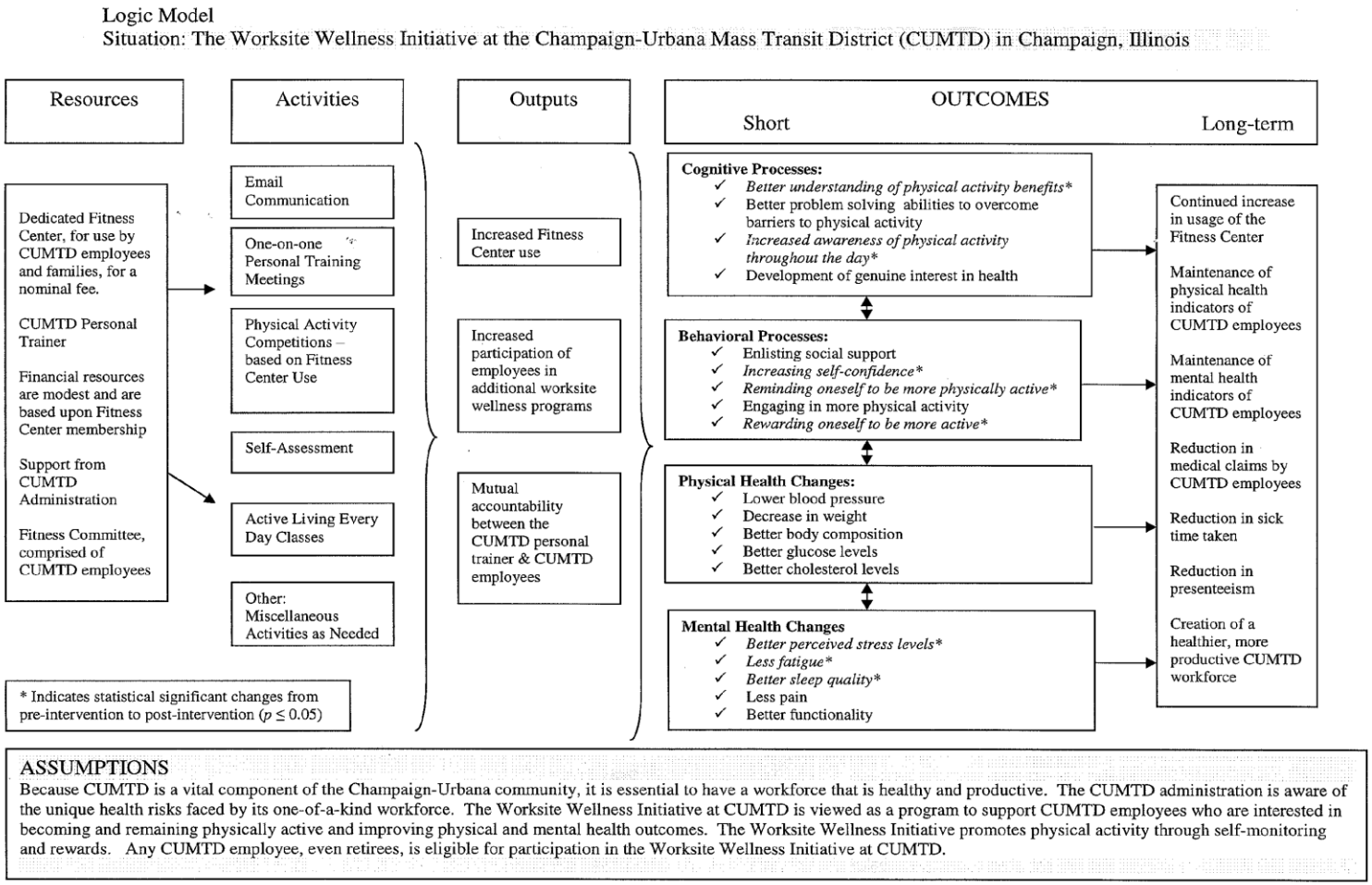

Figure 4

Intervention Logic Model

Intervention Activities	Determinants	Behaviors	Goals
• Implementation of Active Living Every Day Curriculum • Provision of Active Living Every Day book and online resources • Individual and group discussions, focusing on assessing physical activity barriers and benefits • Discussions to help participants understand the importance of self-monitoring • Individual and group discussions, focusing on setting appropriate short-term and long-term goals • Discussions focusing on appropriate rewards for meeting goals • Support for participants to encourage physical activity behaviors • Lesson plans to help participants learn about problem solving strategies to prevent or overcome lapses in physical activity • Take home activities, which encouraged participants to think about goal setting, benefits to physical activity, and high-risk situations outside the class	• Improve participants' stage of change • Improve participants' Decisional Balance Measure scores. A higher score would reflect that a participant sees more benefits to barriers to physical activity. • Increase participants' self-efficacy scores, demonstrating participants have increased their confidence to become more physically active • Improve participants' self-reported sleep quality • Improve participants' perceived stress levels • Increase participants' functionality through better completion of activities of daily life • Improve participants' feelings about physical activity • Improve participants' physical activity enjoyment • Improve participants' fatigue levels • Increase participants' physical activity knowledge • Increase participants' awareness of risks of physical inactivity • Increase participants' healthy opportunities • Improve participants' social support	• Increase in physical activity behavior	• Improve physical (e.g., lower blood pressure, decrease in weight, better body composition, better glucose levels, and better cholesterol levels) and mental health (e.g., better perceived stress levels, less fatigue, better sleep quality, less pain, and better functionality) indicators for Champaign-Urbana Mass Transit Employees

CHAPTER 5

DISCUSSION

The purpose of this study was to determine the effect of a worksite-based physical activity program on reducing sedentary time in a unique population, transit workers. There were three primary aims of the study. The first primary aim of the study was to examine the impact of an existing, evidence-based physical activity behavior change program in creating changes in physical activity behaviors and therefore improving health status of Champaign-Urbana Mass Transit District (CUMTD) employees, including fatigue and stress indicators. The second primary aim of the research study was to develop a framework to be used to tailor interventions for the worksite setting. The third primary aim of the study was to determine the worksite's specific needs for implementation of a worksite wellness program by developing a logic model.

Participants

The participants in this study had atypical demographics. Only 7% had a 4-year degree, yet 71% made $45,000 or more a year. Many of the employees recognized they were fortunate to have a job like the one at MTD. One individual stated, "I am burnt out but there are not many options for someone like me. I'm not like you – I don't have an education really to fall back on. But, I probably make more money than you do and I get a pension and benefits." Participants stated they were willing to sacrifice some parts of their health because of the immense financial rewards. Another individual stated, "Sometimes the stress can be unbearable but I keep going at it because I have better benefits than my spouse, who has a college degree. I have a pension and my health benefits are better." This finding is important because it does demonstrate that although these individuals do have the financial resources to make better health choices, such as eat healthier foods and engage in more physical activity, it is possible their lack of education impedes their

ability to do so. The CDC (2010b) reveals that in 2008, 75% of Americans without a 4-year degree participated in no leisure-time physical activity. For Illinois, 20% of Illinoisans with a 4-year degree reported engaging in no leisure-time physical activity while 80% without a 4-year degree reported participating in no leisure-time physical activity. These statistics corroborate with the findings from this study. The low educational attainment may also be attributed to the sample size. Because we had small sample sizes, particularly in Phase 1, one might see a disproportionate number of individuals with lower educational attainment values. Also, none of the participants in either phase were part of administration, which may have impacted results for educational levels.

Stages of Change

Seventy-one percent of Phase 1 participants progressed through the stages of change continuum. In Phase 2, however, 58 percent of participants moved through the stages of change. A smaller percentage of Phase 2 participants progressed through the stages of change in large part because a greater percentage of these participants started in the stages of preparation and action. In fact, half of the participants who remained at their initial stage started at either action or maintenance. In Phase 1, however, only one individual was in the action stage and two were in preparation. During the 6 week intervention, all of the participants who moved forward in the stages of change only moved forward one stage. Because of the duration of the study, it was unlikely participants would move into the maintenance phase of the stages of change model, since the maintenance phrase requires an individual to be physically active for at least 6 months. These findings are similar to other studies that used the ALED intervention in either its 12 week or 20 week format (Baruth, Wilcox, Wegley, Buchner, Ory, et al. (2010); Callahan, Schoster, Hootman, Brady, Sally, et al. (2007). Baruth et al. (2010) discovered ALED participants in the 12-week Active for Life study progressed through the stages of change, which also allowed them to improve

their physically functionality while Callahan et al. (2007) learned ALED participants with arthritis also progressed through the stages of change, even though the ALED curriculum was not specifically tailored to individuals with arthritis. It is also worth reiterating that none of the participants regressed during either intervention. Participants who did not move forward in the stages of change cited a variety of reasons for not being able to do so. One participant noted significant family problems during this 6 week period, with this individual's father going into hospice and subsequently passing away. This participant was still thinking about being physically active at the end of the intervention, but was unable to make any steps to become physically active due to family situations. Another individual became sick at the start of the intervention and battled the infection for the duration of the intervention. Despite not moving forward in the stages of change, both participants reported thinking more and reading more about physical activity.

Physical Activity Changes

Based on accelerometer data obtained, there were no significant changes in objectively measured physical activity (i.e., via accelerometry) in either Phase 1 or Phase 2 of the intervention. Because of this finding, it cannot be reasonably concluded that either phase of the intervention had any significant impact on participants' physical activity behavior as it was assessed via accelerometry. This study was the first ALED study to assess physical activity using accelerometers, which were one-dimensional Actigraph accelerometers. Despite the lack of statistical significance, participants in both phases reported engaging in more physical activity as the intervention progressed. Participants also reported thinking more about their physical activity behaviors more than prior to the start of the intervention. One individual remarked, "There's just no way I can walk to all my errands so I try to make them more active. I parked farther at the bank and I took a few laps around Wal-Mart before I went shopping." Another participant stated, "I

used to do security at the mall before and I'm thinking about doing mall walking. When I worked, I could do 13 miles in 8 hours."

There are a multitude of reasons to explain the lack of significant changes in objectively measured physical activity in this study. One of the most important reasons is the use of the accelerometer. Although Actigraph accelerometers are used in a variety of studies to capture physical activity data (Oliver, Schofield, Badland, & Shepard, 2010; Troped, Wilson, Matthews, Cromley, & Melly, 2010), it is possible that this tool may not have been the most appropriate one for this population. Many of the participants in the study felt the accelerometer was uncomfortable to wear, especially if they were operators. Also, 84% of participants were classified as either overweight or obese based on BMI. Many individuals complained the accelerometers dug into their bodies. Also, many participants often forgot to wear the accelerometer at the beginning of the day, resulting in less than 10 hours of valid data and rendering the data unusable. Also, because a portion of participants were sedentary, it is possible that the light movement, or increase in steps, which is advocated by the ALED curriculum, may not have registered with the accelerometers. For Phase 1, post-intervention data was collected right around the winter holiday season, which may have impacted participants' activity levels. Participants did mention doing more sitting during the holidays, as they would sit to visit with family and friends or when they were driving longer distances to places they may only visit once or twice a year. In Phase 2, many participants were still feeling the effects from the winter storms from earlier that month. One drawback of the Actigraph accelerometer is its inability to accurately assess individuals when they are doing resistance training, such as weight lifting. Several participants stated they were also doing weight training in addition to their cardiovascular training. Participants mentioned doing weights and using resistance bands as part of their physical activity plan. Unfortunately, this type of physical

activity may not have been accurately recorded by the accelerometer, resulting in statistically insignificant findings.

Although significant effects in physical activity changes were not seen during this 6 week intervention, a longer study may have demonstrated significant changes in physical activity levels. The 12-week intervention conducted by Wilcox, Dowda, Leviton, Bartlett-Prescott, Hazzarre, et al. (2008) resulted in moderate and vigorous physical activity levels of 2.2 hours/week, which was far less than the levels achieved in this study. Similar moderate and vigorous physical activity levels could have been achieved in this study had moderate and vigorous physical activity been combined into one unit and had the intervention been longer, allowing more time for participants to make cognitive and behavioral changes. It could be argued, however, despite the lack of statistical significance, there is practical significance in this finding.

Decisional Balance

Decisional balance is a crucial component to helping participants understand their perceived benefits of physical activity as opposed to their perceived barriers of physical activity. It is hypothesized that an individual's ratio of perceived benefits to perceived barriers to physical activity can have an impact on their willingness to become more physically active (Marcus & Owen, 1992). Increasing an individual's perceived benefits of physical activity is hypothesized to lead to that individual becoming more physically active (Marcus, Rakowski, & Rossi, 1992).

In the present study, no significant change in decisional balance was noticed in Phase 1, but there was a significant change for Phase 2. For Phase 1, at the start of the intervention, the decisional balance score indicated that participants believed there were more barriers to becoming physically active than there were benefits. At post-intervention, the mean decisional balance score had increased, albeit not significantly. It is worth pointing out that the effect size for the change

was 0.65, highlighting the lack of statistical power (i.e., small sample size) to detect the change. This is reinforced by the fact that, at post-intervention, although participants still felt there were more barriers to becoming physically active than there were benefits, there was a concomitant increase in their beliefs of the benefits of physical activity. For Phase 2, the pre-intervention mean decisional balance score was even lower than in Phase 1, indicating a belief that physical activity was not at all important, but by the time post-intervention testing occurred, participants believed physical activity was slightly important. One participant reported, "I am not as tired from walking as I used to be and I'm realizing walking is the best physical activity I can do." Another individual followed up this statement by saying, "This class has helped me realize how important it is to be physically active to maintain your body aches, pains, and sicknesses." As with Phase 1, the effect size for the change was 0.64. It is important to bear in mind, for both phases, the sample sizes were relatively small. Additionally, the Decisional Balance measure asks individuals how they feel about physical activity at that precise moment in time. Recall that the partial eta-squared values were similar for both phases, as were the effect sizes. It is reasonable to argue that, if there had been more participants in Phase 1, there would have also been a statistically significant increase of the decisional balance measure.

Processes of Change

According to Prochaska and DiClemente (1983), individuals use cognitive and behavioral strategies to make behavior changes and move through the stages of change. Individuals in earlier stages, like contemplation and preparation, tend to use cognitive strategies more frequently than individuals who are in later stages, like action or maintenance, who generally use behavioral strategies more frequently. Improving participants' cognitive processes are important to help individuals in the earlier stages progress toward changing their physical activity behavior (Rosen,

2000). Increasing use of behavioral strategies has consistently been shown to be associated with increases in physical activity behaviors (Pinto, Lynn, Marcus, DePue, & Goldstein, 2001; Sallis, Calfas, Alcaraz, Gehrman, & Johnson, 1999).In the present study, 10 processes of change, five cognitive and five behavioral, were measured. The five processes of cognitive change were 1) increasing knowledge, 2) being aware of risks, 3) caring about consequences to others, 4) comprehending benefits, and 5) increasing healthy opportunities; the five processes of behavioral change were 1) substituting alternatives, 2) enlisting social support, 3) rewarding oneself, 4) committing oneself, and 5) reminding oneself. The five cognitive processes of change are emphasized heavily in the first half of the ALED curriculum (i.e., weeks 1-3) while the five behavioral processes of change are focused on in the second half of the program (i.e., weeks 4-6).

In the non-tailored intervention, two of the cognitive processes (caring about consequences to others, increasing healthy opportunities) and two of the behavioral processes (committing oneself, reminding oneself) changed significantly over the 6-week intervention. For several participants, understanding about consequences to others was a key turning point for them. There were several mothers in the group who began to consciously think about what would happen to their families if something were to happen to them because of their physical inactivity. Several reported not having thought about how their inactivity affected others prior to joining the program. Learning about the consequences of their physical inactivity was an "a-ha" moment" for many of them and also encouraged them to incorporate little bouts of physical activity throughout the day, such as the 2-minute walks, which demonstrated their willingness to increase healthy opportunities throughout the day. Reminding oneself also appeared to play a significant role in helping individuals commit to physical activity throughout the day. One participant revealed, "The importance of a structure and plan is becoming more important to me. When you do it almost

daily, it becomes a habit." Another individual reported, "I've set a plan to walk Monday, Wednesday, and Friday on my treadmill at home before work on my next boards since I switched my boards to have a more regular schedule. I'm going to try to do some weights on Tuesdays and Thursdays at the Fitness Center. I'm going to meet with Justin to figure out something that works for me." Although no statistical significant results were found for substituting alternatives in this phase of the intervention, participants did report engaging in more physical activity by choosing to be less inactive. One individual stated, "I'm using my layovers better now. Whenever I have a layover, I make sure I either walk in the bus or walk around the bus until it's time to go again."

For the tailored intervention, only one cognitive process (increasing healthy opportunities) and three behavioral processes (substituting alternatives, reminding oneself, rewarding oneself) changed significantly over the 6 weeks. Individuals reported writing down physical activity sessions in their calendars and scheduling physical activity appointments, a technique acquired from the ALED curriculum. Participants also reported using other techniques to remind themselves. One individual reported, "You recommended setting an alarm on my computer to get up and move or stretch when I'm doing work in my office and that has helped a lot. Sometimes when I get focused on the paperwork, I forget but the alarm helps me. I really need the reminder." One component of the ALED curriculum involved tracking one's thoughts about physical activity and whether the individual acted upon these thoughts about physical activity. Although significant changes were not seen in actual physical activity levels, participants did report thinking more about physical activity and how to incorporate it more throughout their day. This finding is particularly salient because individuals need to change the way they think about physical activity (changing cognitive processes) before they can change their actual physical activity behaviors (changing behavioral processes). One participant remarked:

I was really surprised to see how not active I am throughout the day. I thought I was active but it was like you said where we confuse being busy with being active. I'm thinking now about ways to fit it in.

This statement demonstrates how participants began to change their way of thinking about physical activity. Another component of the ALED curriculum involved the concept of 2-minute walks. One individual stated, "I've made a few more trips from the garage to the main building. I'm moving, or trying to, a little faster so I can get my two minute walks in." It cannot be determined with certainty why the two interventions resulted in somewhat different patterns of results, but it seems likely that the tailoring as a result of the focus group feedback may have led to a greater emphasis on adjustments that favored behavioral processes more so than cognitive processes. Regardless, there seemed to be some overlap between the two interventions: consequences and opportunities emerged as significant (or nearly significant) cognitive processes and reminding and rewarding emerged as significant (or nearly significant) behavioral processes. It may be a worthwhile exercise to determine whether these four processes emerge in subsequent research as important processes for this particular occupational group.

Self-Efficacy

According to Bandura (1997), self-efficacy is an individual's confidence in him/herself to perform a specific behavior in a specific situation. An increase in self-efficacy has been shown to be important in increasing an individual's physical activity levels (Brassington, Atienza, Perczek, Dilorenzo, & King, 2002). Self-efficacy was measured using a 5-item questionnaire developed by Marcus, Selby, Niaura, & Rossi (1992). Each question was measured using a 5-point Likert scale, with 1 being "not at all confident" and with 5 being "extremely confident." There were no significant differences in self-efficacy values from pre-intervention to post-intervention for either

Phase 1 or Phase 2 of the study. In Phase 1, mean pre-intervention self-efficacy showed that participants were slightly confident in their ability to be physically active when they were tired, in a bad mood, pressed for time, on vacation, or during poor weather. As the intervention progressed, however, participants increased their self-efficacy to a point where they were moderately confident in their ability to be physically active during high-risk situations. There was also a rather large effect size, which revealed the significant impact the ALED intervention had on improving participants' self-efficacy. Because mean self-efficacy increased, coupled with the large effect size, it could be argued that a larger sample size would have resulted in a statistically significant change. Despite the lack of statistically significant change, several Phase 1 participants expressed an increase in their self-efficacy by addressing high-risk situations relevant to them, a practically meaningful outcome. For example, several participants discussed their plans for obtaining physical activity during the holidays. This high-risk situation, however, was not addressed in the self-efficacy questionnaire used.

For Phase 2, the mean pre-intervention self-efficacy value revealed that Phase 2 participants were almost moderately confident in their ability to be physically active in high-risk situations. The mean post-intervention self-efficacy value increased slightly, although again, not significantly, but with a moderately large effect size. The effect size demonstrates the ALED intervention did have a sizable effect on participants' self-efficacy. Because self-efficacy has been documented to be an important component to increasing participants' physical activity levels, the increase in self-efficacy is deemed important. It could be argued, however, despite the lack of statistical significance, there is practical significance in this finding. Phase 2 participants were especially receptive to the intervention and several of them stated their confidence in their ability to become and stay physically active increased as the intervention progressed. One individual stated, "I've

gained confidence in myself to continue being physically active. I know I've got the skills now to do it. It's just up to me now." This statement is important because it has been well documented how important self-efficacy is to helping individuals become and remain active.

Physical and Mental Health

The SF-36 is an important tool to assess physical and mental health changes due to engaging in health behaviors, like incorporating more physical activity into one's lifestyle. The SF-36 is important because it gives participants an indication of how physical activity affects their mental and physical health status. The SF-36 is separated into two categories, each with four dimensions. The physical health category encompasses the physical function, physical role, body pain, and general health dimensions. The mental health category includes the vitality, social functioning, emotional role, and mental health dimensions.

Results from the SF-36 did not show any significant differences from pre-intervention testing to post-intervention testing for Phase 1. In Phase 1, one can see that participants' physical and mental health statuses did not improve from pre-intervention to post-intervention. The lack of change could be explained by the stress and burden of the holiday season since post-testing took place just prior to the holiday season. Additionally, one individual in the study was very sick during the post-testing portion of the study. Because the sample size was so small (n = 7), this one person's results may have impacted the SF-36 scores. The effect size, also, was also quite small, which indicates the ALED intervention had a trivial effect on the mental and physical health statuses of Phase 1 participants.

Unlike Phase 1, there was a significant difference from pre-intervention testing to post-intervention testing in Phase 2. This finding was corroborated by qualitative data gathered during the study, as well. Participants reported better physical and mental health statuses as the

intervention progressed. Participants reported a better quality of sleep, less joint pain, and more motivation to do things. The moderately large effect size further supports the idea that the ALED intervention had a significant effect on increasing participants' overall SF-36 scores. Some participants, however, did not improve their SF-36 scores. One of the most significant barriers to improving SF-36 scores was the Blizzard of 2011. For many CUMTD employees, the Blizzard of 2011 was a trying experience. Since the SF-36 asks about physical and mental health during the past four weeks, the Blizzard of 2011 fell during this time period for post-intervention testing. Participants reported accomplishing less than they wanted to and reducing the amount of time spent on other activities due to their physical and emotional health. Several participants experienced an increase in bodily pain during that 4 week period. Many participants suggested this bodily pain was due to long hours on the bus or an increase in clearing out snow and ice in bus shelters.

Looking at each category separately, there was no significant time effect for either physical or mental health categories for Phase 1 of the study. None of the 8 dimensions analyzed demonstrated any significant changes either. Despite the fact none of the dimensions displayed any statistically significant changes, small effect sizes were seen in physical role while moderate effect sizes were seen in the dimensions of physical function, body pain, general health and emotional role. A large effect size was seen in the dimension of vitality. For Phase 2 of the study, there were also no significant time effects for the physical or mental health categories. There were, however, significant increases in participants' general health, vitality, social functioning, and mental health. These changes are especially relevant for this population. Many of the operators reported feeling better after engaging in physical activity and believed their driving and customer service skills improved because they were physically active. One participant reported being "friendlier and nicer" and "wanting to go out of the way to help a co-worker." Another participant reported

answering the phone "with a smile" now because she felt more energized and excited to be there, even on the craziest of days, such as when the STOPWATCH (CUMTD's online bus tracking system) was down. Another participant stated, "I'm now more aware of my surroundings. I'm in better control and I'm aware of the road and the bus and just everything going on around me." This statement was corroborated by fellow participant who said, "I am definitely a better driver because I am more focused and more on. I can catch things quicker and faster than I did before. I'm not even making little mistakes now. I'm definitely better." Another participant stated, "It wasn't that I was ever grouchy or rude before; I just wasn't friendly. Now, I'm noticing I'm greeting my riders with a smile and it makes a big difference in my attitude." Some individuals mentioned not only being friendlier to their passengers but also to their fellow colleagues. One participant remarked, "Sometimes when you see a particular operator come in with a card you just groan inside but now I'm a little more patient with that driver because I know how rough it can be out there." Many participants did, however, mention the effect the Blizzard of 2011 had on their physical and mental health statuses, which may have explained the lack of significance in these dimensions of health. One individual stated:

> The storm also pushed my body's limits and mental limits. It's hard to be cheerful when people are harassing you because the shelters aren't completely shoveled out and busses are running late because of all the snow. What they don't realize is we're out there at least! We ran the Wednesday the U of I was closed and we had 20,000 riders that day. A lot of people were grateful but a lot of other people were wondering why we were running late and why there weren't more busses on the road.

Based on these findings, one can reasonably conclude the ALED intervention played a significant role in helping participants improve these aspects of their mental health status. Future research directions could include implementing the intervention at a time (e.g., summer) where weather may not have such significant effects on the findings.

Fatigue

Fatigue is an important issue faced by mass transit workers. Many participants reported enrolling in the ALED program to learn more about how physical activity can help battle fatigue. Fatigue was a factor that affected not only their work lives but their personal lives, as well. One individual remarked, "My normal day is to get my son ready, take him to day care, come to work, pick him up, feed and bathe him and by the time that is over, I am just pooped. There is not a single thing I can do. All I want to do is watch tv and I usually end up doing just that." Fatigue was measured using the Multidimensional Fatigue Inventory (MFI; Smets, Garssen, Bonke, & De Haes, 1995). The MFI assesses five dimensions of fatigue: general fatigue, physical fatigue, mental fatigue, reduced motivation, and reduced activity. Higher values on the dimensions of the MFI correspond with higher levels of fatigue.

In Phases 1 and 2 of the study, general fatigue scores improved, albeit not significantly, from baseline to post-testing. One explanation for the lack of a statistically significant difference and the relatively small effect size in Phase 1 could be the post-intervention timing period. Post-intervention testing was conducted right before the Christmas holiday, which may have impacted how participants felt during that time period; however, this explanation would not hold for the lack of change in Phase 2.

Another dimension of fatigue captured by the MFI is physical fatigue. Participants in Phase 1 demonstrated a non-significant improvement in their physical fatigue scores, but the effect size

was large, demonstrating the ALED intervention had an impact on changing participants' physical fatigue scores. Clearly, a larger sample size would have resulted in statistically significant changes. Physical fatigue also improved in Phase 2, but not statistically significant. The lack of change in this phase may have been due to the lingering effects from the Blizzard of 2011. Although the Blizzard occurred in the early part of February and post-testing did not occur until the later part of February, many CUMTD employees were still feeling the effects from that stressful, busy week. One employee stated, "These last few weeks have been really hard with the bad weather and all. You want to go do something but it's hard to find time when you're being called in to work overtime." This finding was corroborated by an operator who stated, "I just know I've been even more tired than ever before because of the snow and ice. I'm driving even more carefully than before. Imagine trying to control your card during an ice storm and multiple that by 10 – that's what I'm doing. I'm just mentally drained when I get off the bus. It's a good thing I live close by because driving home is tiring. Maintenance staff discussed the physical toll being put on their bodies by the constant bad weather since part of their responsibilities include clearing out the snow and ice in shelters. Also, the bad weather caused more mechanical issues with the busses, which also placed a significant physical burden on their bodies.

The third dimension of fatigue analyzed was mental fatigue. Mental fatigue did not change in either Phase 1 or 2. Based on these findings, one cannot conclude the ALED intervention had any impact on participants' general fatigue. The lack of significant findings and small effect size in Phase 2 may be attributed to two things: the poor weather conditions and the time of the intervention. CUMTD employees consistently remarked on how the constant winter storms had impacted their mental fatigue; operators were required to pay even more attention than before to road conditions, the maintenance staff was seeing an increase in maintenance requests, and the

clerical staff was reporting higher frequencies of calls from riders. Also, the intervention peaked during the busiest time for CUMTD, the spring semester at the University of Illinois. The constant barrage of winter storms coupled with the increased ridership may have had significant effects on Phase 2 results.

For Phase 1, participants improved their reduced motivation score at post-intervention from baseline, with a moderate effect size, but not significantly. Based on these findings, it could be assumed that a larger sample size would have resulted in a statistically significant difference, as well. For Phase 2 participants had a significant increase in their reduced motivation scores at post-intervention from baseline. Based on these results, it is reasonable to conclude that the improvements in reduced motivation were due to the implementation of the ALED program. The rather large effect size shows that the effect can be attributed to the ALED intervention because lesson plans in ALED addressed issues such as rewarding oneself and planning for enjoyable physical activity, which are facets of the reduced motivation dimension.

The final dimension of fatigue examined was reduced activity. There was no significant change in reduced activity for either Phase 1 or Phase 2. It could be that the lack of improvement in reduced activity in Phase 1 could have been due to the timing of the post-intervention testing, which occurred right before the Christmas holiday season. Several individuals did mention feeling overwhelmed due to the increase in family obligations. For Phase 2, the lack of significant increase may be attributed, again, to the constant bad weather. Many participants reported not having the energy or desire to participate in activities after finishing work due to the unprecedented burden placed on them by the continual winter storms. Several individuals mentioned not accomplishing as much as they wanted in their personal lives due to the demands of the job placed on them by the storms. One individual noted, “Some of us had to stay here overnight. Who wants to do anything

when you're stuck here, away from your home, knowing you've got to go out there and face that garbage the next day."

Although no differences in fatigue scores were demonstrated in Phase 1 of the study, Phase 2 did result in a significant improvement in reduced motivation. For Phase 2, physical fatigue and reduced activity had *p*-values of 0.10. Although these values were not statistically significant, it could be argued these values are nonetheless meaningful. Because values were relatively close to the statistically significant benchmark of $p \leq 0.05$, one could argue there was a positive reduction in fatigue states in Phase 2 participants. Participants reported having more energy to engage in activities with friends and families. One individual stated, "I really have more energy now. People around here probably think I'm on drugs or something because I have more energy and I'm less crabby." One possible explanation for the lack of statistical significance may be due to the working conditions of these employees. Although the Blizzard of 2011 was two weeks prior to post-testing, the CUMTD was still feeling the ramifications from that storm and the subsequent on the following weekend (February 5, 2011). These back-to-back winter storms caused many CUMTD employees to work longer, more stressful hours. One individual stated, "These storms have pushed my body's limits and I'm just exhausted. It takes everything to get through work and I have no energy to do anything when I'm off work." Comparing Phase 1 to Phase 2, only one dimension of fatigue resulted in any significant differences: physical fatigue. Again, the lack of statistical significance may be attributed to the severe weather conditions faced during Phase 2 of the intervention, coupled with atypical working conditions, such as longer working hours and poor road conditions.

Sleep Quality

Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI; Buysse, Reynolds, Monk, Berman, & Kupfer, 1989). This nine-item questionnaire assesses an individual's sleep quality and disturbances over the course of one month. Higher scores on the PSQI correlate with poor sleep quality and disturbances. Improvement of sleep quality was also another reason given by several CUMTD employees for wanting to join the ALED program.

There was no change in sleep quality, based on the PSQI, from baseline to post-intervention for participants in Phase 1, but there was for participants in Phase 2. Once again, the first Phase of the intervention had only seven participants complete the study. Participants in Phase 2 stated their sleep quality was better than before and many of them were sleeping longer, too. Additionally, participants in Phase 2 believed they were better drivers because of their improved sleep quality. One operator remarked, "I'm catching things that I didn't before. More often than before I am aware of what's going on in my bus and out on the road." Because the CUMTD operates heavily on the University of Illinois campus, it is vital for its operators to be well rested to be more aware of their surroundings, both in the bus and on the road.

Perceived Stress

Stress is a major issue faced by mass transit workers (Roohi & Hayee, 2010). Mass transit workers face stress from a variety of situations, including road conditions, passengers, administration, and weather conditions (Machin & Hoare, 2008). Because of the unusually high levels of stress faced by mass transit workers, it was one of the primary reasons for CUMTD employees for joining the ALED program. Participants' perceived stress was assessed using the Perceived Stress Scale (PSS; Cohen & Williamson, 1988); higher scores correspond with higher levels of perceived stress.

Perceived stress levels from pre-intervention to post-intervention were unchanged in Phase 1. Participants in Phase 2, however, demonstrated significant reductions in perceived stress from pre-intervention to post-intervention. This finding could be interpreted as the ALED intervention having played a significant role in improving participants' perceived stress levels. In addition to the statistical significance of this finding, there is practical significance, as well. Stress has been reported by CUMTD employees as a crucial factor to their happiness not only at work, but at home as well.

Stress is a factor, which affects many CUMTD employees' professional lives, as well as their personal ones. One of the recurring reasons for joining the ALED program given by CUMTD employees was to learn more about how to better manage stress in their lives. One individual stated, "After my surgery last year, I made a commitment to get healthy and I think being physically active would help me focus my mind and help with a lot of the stress I have." Other participants believed the stress incurred at work affected their family lives. One individual remarked, "I'm stressed all the time and I know I take it home to my family. It just isn't good but what choice do I have?"

Although the data did not demonstrate any significant differences in perceived stress in Phase 1 of the intervention, participants in this Phase acknowledged improving their knowledge about better stress management. One individual remarked, "This class has helped me learn more about how being physically active can help me manage my stress better. I know it'll make a big difference for me and my family." Yet another individual commented, "Today I just had a really stressful situation where a coworker put me in a bad spot and there was no good way to get out of it. Here I am thinking about it 2 hours later and I know I'm still going to focus on it after I'm done here and I go home. I know I take a lot of this job's stress home with me."

Many individuals in Phase 2 believed the combination of stress-reducing techniques coupled with increased physical activity helped with the reduction of perceived stress. Participants in Phase 2 thought the reduction in perceived stress was important to their happiness, both at work and at home. As the intervention progressed, participants in Phase 2 acknowledged physical activity was important for stress reduction. Additionally, participants who were operators identified and used stress techniques that were personal and meaningful to them. One operator remarked, "The stress techniques are things I can use when I'm driving. It just takes a few seconds but it is enough."

Participants also believed stress techniques and issues related to stress should be incorporated earlier into the ALED program. Currently, the 12-week ALED curriculum discusses stress in depth during week 9, which was condensed to week 5 for the abbreviated 6-week ALED curriculum used in this study. Participants wanted stress techniques to be discussed earlier in the ALED program since a recurring reason given for joining the ALED program was to learn more about how physical activity can influence one's stress levels. Also, because this population is uniquely affected by stress, it may be more beneficial to include issues pertaining to stress from the beginning.

Activities of Daily Living

Participants' abilities to complete activities of daily living were measured using the Activities of Daily Living Instrument (McDowell & Newell, 1996). Activities of daily living included things such as getting in and out of a car, walking a quarter of a mile, and getting up and down from a couch or recliner. Higher scores correlate with better functionality. Phase 1 participants slightly increased their functionality over the course of the intervention. Although there was an increase in functionality, it was not a statistically significant increase. For Phase 2,

like Phase 1, there was an increase in participants' functionality, but not one that was statistically significant. The effect sizes for both phases were also relatively small, which meant there was a trivial effect of the intervention on functionality. It could be hypothesized that the small sample sizes may have contributed to the under-powering. Additionally, several participants in Phase 2 mentioned soreness and extreme muscle fatigue, resulting from overtime work during the Blizzard of 2011, which may have impacted scores.

Participants' Feelings During Physical Activity

Participants' affective states while participating in physical activity is an important component of encouraging people to become and remain physically active (Williams, 2008). Participants' affective states during a bout of physical activity were recorded using the Feeling Scale (Hardy and Rejeski, 1989). Scores on the scale reflects how a participant feels while they are engaged in a bout of physical activity. A score of -5 represents "Very Bad" while a +5 represents "Very Good".

Participants in Phase 1, at pre-invention, reported an affective state during physical activity of "Fairly Good." At the conclusion of the intervention, participants' affective scores were between "Fairly Good" and "Good." Although participants' felt better about physical activity and enjoyed it more, there was not a statistically significant change as a result of the intervention, although the effect was rather large. The argument could be made, however, that despite the lack of statistical significance, there is practical significance because participants seemed to feel better during physical activity post-intervention. Participants also mentioned feeling better after becoming physically active. One individual remarked, "I just feel better after I do it now. I used to think it was a chore and it's not so much anymore."

For Phase 2, at timepoint zero, participants' affective states during physical activity were neutral. At the end of the intervention, participants' feelings during physical activity became more positive as the intervention progressed because their feelings went from neutral to feeling "Good" during the physical activity, a statistically significant change. The accompanying large effect size demonstrates the significant impact participating in the ALED intervention had on individuals' affective states. Many participants attributed their increase in positive feelings during physical activity to finding physical activity they enjoyed, an increase in self-efficacy, and re-thinking their attitude toward physical activity.

Physical Activity Enjoyment

Physical activity enjoyment has been associated with becoming and staying physically active (Wankel, 1993). Multiple studies have demonstrated the link between enjoying physical activity and adhering to physical activity programs and increasing physical activity levels (Rovniak, Anderson, Winett, & Stephens, 2002; Williams, Papandonatos, Napolitano, & Lewis, 2006). The non-tailored group of participants increased their physical activity enjoyment by the conclusion of the intervention, albeit not significantly. The large effect size revealed the sizable impact the implementation of the ALED intervention on participants' enjoyment of physical activity. Despite the lack of statistical significance, there is practical significance in the findings. Participants in Phase 1 stated they found enjoyment in physical activity as the intervention progressed. Many individuals experienced a sense of accomplishment after completing their bout of physical activity and others found it invigorating. Also, because participants were enjoying physical activity, often for the first time ever in their lives, many of them were encouraging their families to become physically active with them. One individual stated, "I am enjoying walking and playing with my grandchildren more than ever before." Yet another individual reported,"

The tailored intervention group did significantly improve their levels of physical activity enjoyment as the intervention progressed. Along with the accompanying large effect size, this revealed how important the intervention was to increasing participants' physical activity enjoyment. Because physical activity enjoyment as been correlated with starting and maintaining physical activity behaviors (Wankel, 1993), the changes in physical activity enjoyment are crucial to ensuring this population remains physically active. It is worth noting that the increase in enjoyment of the activity is likely linked to the increased positive affect experienced during the activity. This affect-enjoyment link has been widely speculated on, but has rarely been demonstrated. While not direct evidence, the results from this study suggest that this link is indeed important. Future research would do well to not only examine this link more carefully, but to also follow it to the next level, that is, adherence. Again, it has been widely speculated for some time that people would be more likely to adhere to a physical activity program they enjoy, but this has rarely been demonstrated empirically.

Logic Model

A logic model (Figure 3) was developed to assist CUMTD administration and employees with further program development and implementation. The logic model was developed under the assumptions that because CUMTD is a vital component of the Champaign-Urbana community, it is essential to have a workforce that is healthy and productive. The CUMTD administration is aware of the unique health risks faced by its one-of-a-kind workforce. The Worksite Wellness Initiative at CUMTD is viewed as a program to support CUMTD employees who are interested in becoming and remaining physically active and improving physical and mental health outcomes. The Worksite Wellness Initiative promotes physical activity through self-monitoring and rewards. Any CUMTD employee, even retirees, is eligible for participation in this program at CUMTD. The

logic model was broken into four sections: resources, activities, outputs, and outcomes, both short-term and long-term. Resources included a dedicated Fitness Center for use by CUMTD employees and families for a nominal fee, CUMTD personal trainer, modest financial resources based upon Fitness Center membership, support from CUMTD administration, and a Fitness Committee comprised of CUMTD employees. Activities included email communication from the Fitness Committee to CUMTD employees, one-on-one personal training meetings, physical activity competitions based on Fitness Center use, self-assessments, a behavior modification class (ALED), and other miscellaneous activities as needed. Outputs consisted of increased Fitness Center usage, increased participation of employees in additional worksite wellness programs, and mutual accountability between the CUMTD personal trainer and employees. Short-term outcomes were divided into four categories: cognitive processes, behavioral processes, physical health changes, and mental health changes. Cognitive processes consisted of better understanding of physical activity benefits, better problem solving abilities to overcome barriers to physical activity, increased awareness of physical activity throughout the day, and development of genuine interest in improving health. Behavior processes included enlisting social support, increasing self-confidence, and engaging in more physical activity. Participants reported, "Social support is really important to me. I wouldn't go on walks or do the Fitness Center if I didn't have someone encouraging me." Physical health changes consisted of lower blood pressure, decrease in weight, better body composition, better glucose levels, and better cholesterol levels. Mental health changes encompassed a decrease in perceived stress, decrease in perceived pain, decrease in fatigue, and an increase in sleep quality. Long-term outcomes were comprised of continued increase in usage of the Fitness Center, maintenance of better physical and mental health indicators for CUMTD

employees, reduction in medical claims by CUMTD employees, reduction in sick time taken, reduction in presenteeism, and a creation of a healthier, more productive CUMTD workforce.

Program Theory Development

According to Weiss (1998), program theory is the "assumptions about the chain of interventions and participant responses that lead to program outcomes" (p. 335). The development of the program theory for the CUMTD was influenced not only by the social science but also by the perspectives of the participants. Weiss's description of program theory incorporates program inputs, program activities, interim outcomes, and desired end results. According to Weiss (1998), program inputs include the program's resources and organizational culture while program activities are the various ways the program is implemented. Interim outcomes include the "chain of responses the activities elicit" (p. 62, Weiss, 1998). Interim outcomes eventually lead to desired end results. The program theory is based on the assumption that because CUMTD is a vital component of the Champaign-Urbana community, it is essential to have a workforce that is healthy and productive. The CUMTD administration is aware of the unique health risks faced by its one-of-a-kind workforce. The Worksite Wellness Initiative at CUMTD is viewed as a program to support CUMTD employees who are interested in becoming and remaining physically active and improving physical and mental health outcomes. The Worksite Wellness Initiative promotes physical activity through self-monitoring and rewards. Any CUMTD employee, even retirees, is eligible for participation in the Worksite Wellness Initiative at CUMTD.

For the CUMTD Wellness Initiative Program, one of the primary program inputs included the dedicated Fitness Center, which was created by CUMTD employees and is still maintained by CUMTD employees. The Fitness Center is for exclusive use by CUMTD employees and families, for a nominal fee of $5 per month. Although a Fitness Center does exist, many employees are

hesitant to use the facility. One individual stated, “As a newer driver, I’m not as familiar with the other drivers so there’s not that friendship at the Fitness Center.” Other operators felt the Fitness Center was not easily accessible for use. One operator stated, “The Fitness Center is here and I don’t always make it over here. This board, I pick up all my routes either at Illinois Terminal or Lincoln Square, never at the actual garage.” This statement was corroborated by other drivers who did not find the Fitness Center location to be convenient and would prefer if CUMTD could place one or two pieces of exercise equipment at Illinois Terminal.

Others believed the Fitness Center was not a welcoming environment for several reasons. One individual stated, “The Fitness Center tries to act like a support center but it isn't always like that. I know there's that tutorial you can use but it's not the same thing as having someone there to show you how to do it. I've met with Justin a few times but he can't always meet with me when I want, you know.” This statement was corroborated by another employee who reported, “I try to encourage the newbies in the Fitness Center but not everyone is like that. Sometimes you'll have people hazing you. When I first started, I wasn't lifting as much as some people I thought I should for a big guy but I didn't have the strength, either. I got some hazing for that.” Others did not feel comfortable exercising in the Fitness Center because often administration would be exercising at the same time. There was a perceived distrust of the Fitness Center as another way for CUMTD to make additional money and to also keep tabs on their employees. Another program input includes the CUMTD Personal Trainer, who meets with CUMTD employees upon request. Participants reported using the Personal Trainer and developing workouts specific to them. One individual stated, “I met with Justin (the Personal Trainer) to develop a plan for me. It's 3 times a week, for 45 minutes but I can do it before I have to report for my shift.” The financial resources for the program are modest and are based upon Fitness Center membership, which is $5 per month. The

financial resources are used for Fitness Center maintenance and to provide additional wellness programs, such as ALED. Financial resources are also used to provide incentives for the exercise competitions, which are based on Fitness Center use. Additionally, there is support from the CUMTD administration, which encourages employees to use the Fitness Center and also allows for employees' families to use the center, too. Finally, there is a Fitness Committee, which is comprised of CUMTD employees, and is responsible for all Fitness Center programming and maintenance.

For the CUMTD, there are a variety of program activities, which comprise the intervention. One of the most important program activities is the physical activity competitions, which are based on Fitness Center usage. Employees can earn points for every 30 minutes of exercise completed in the Fitness Center. These points are tallied every 3 months, or quarterly, and participants can win prizes. Based on the points obtained, an individual can win a $24, $50, or $75 gift certificate to local stores, such as Menards, Meijer, or Wal-Mart. These physical activity competitions provided additional incentives for employees to use the Fitness Center. One individual stated, "My wife and I were doing the Fitness Center challenges but we started slacking off when we started getting busier. We're going to start back, though, because we sure do miss those gift certificates." Another program activity was one-on-one personal training meetings. Employees found these one-on-one personal training meetings to be beneficial because it gave them a chance to learn more about the exercise equipment in the Fitness Center and also provided them an opportunity to learn more about their fitness markers, such as body composition, blood pressure, and weight. These one-on-one personal training meetings provided employees with the opportunity to develop an exercise plan that was meaningful and relevant to them, which may lead to their adherence and success at becoming and remaining physically active. Self-assessments were also important to the

program theory development. Participants assessed their willingness to be physically active among other factors. Email communication and Intranet communication between the Fitness Committee and CUMTD employees was a crucial component of the program intervention because it provided an avenue of open and honest communication between the two groups. Use of the Intranet provided employees with healthy living habits and allowed them to register for use of the exercise equipment and for the ALED class. It provided a way to communicate with all employees in a quick, yet efficient manner. The ALED course was also another component of the program activities. This course provided an opportunity for employees to learn more about the benefits and effects of physical activity in a non-threatening environment, such as a fitness center. Finally, other miscellaneous activities as needed occurred, which included placement of recruitment posters and flyers.

There were four categories of interim outcomes, which will eventually lead to the desired end results. These four categories were changes in cognitive processes, behavioral processes, physical health, and mental health. For cognitive processes, participants reported developing genuine interest in health, better understanding of physical activity benefits, developing better problem solving abilities to overcome barriers to physical activity, and increasing awareness of physical activity throughout the day. Better understanding of physical activity benefits and increasing awareness of physical activity throughout the day were also statistically significant results based on the quantitative measures. For the behavioral processes, participants learned to enlist social support, increase self-confidence, remind oneself to be more physically active, engage in more physical activity, and reward oneself for being more active. Significant findings were found in increasing self-confidence, reminding oneself, and rewarding oneself. For physical health changes, there were self-reported improvements in blood pressure, body weight, body composition,

blood glucose levels, and cholesterol levels. For mental health changes, there were improvements in perceived stress levels, fatigue, sleep quality, pain, and functionality. Significant findings were in perceived stress levels, fatigue, and sleep quality. These four categories provided a chain of responses based on the program activities and will eventually lead to the desired end results.

There were several components, which comprised the intervention's desired end results. First, it was hoped the activities would change interim outcomes to create a continued increase in Fitness Center usage. Desired end results included maintenance of physical and mental health changes and indicators for CUMTD employees. It is also hoped that the intervention will result in reductions in CUMTD employees' medical claims, sick time taken, and presenteeism. All of these components together will result in the creation of a healthier, more productive CUMTD workforce.

Tailoring

From the study's results, it is inconclusive whether tailoring the ALED curriculum produces any significant changes in physical activity levels and other measures of health, such as fatigue and perceived stress. Examination of the results revealed that only two measures significantly improved comparing the non-tailored mean post-intervention results to the tailored mean post-intervention results. These measures were increasing healthy opportunities and physical fatigue. If one examines data from the non-tailored version of intervention, only 4 of the 26 measures demonstrated any positive, significant changes. Looking at the tailored version, however, 11 of the 26 measures displayed positive, significant changes from pre-intervention to post-intervention. Based on these findings, it cannot be definitively determined whether tailoring the ALED curriculum had any impact on the post-intervention results in Phase 2.

Based on the findings on the focus group from Phase 1, a new, tailored form of recruitment was used. For Phase 1, recruitment was done using only advertisements in the employee newsletter

along with flyers and posters that were placed around the CUMTD main campus, which not every employee visited on a daily basis. Additionally, employees were asked to contact the researcher if they were interested in participating in the ALED program. The focus group findings, however, recommended using a testimonial from a Phase 1 participant for recruitment methods. The use of a testimonial proved to be one of the most useful and successful recruiting techniques used for Phase 2 and resulted in nearly a three-fold increase in participants for Phase 2. Phase 2 participants reported more interest in committing to the ALED program based on their fellow co-worker's testimonial. This testimonial provided a level of support and trust the researcher was unable to obtain on her own. Also, Phase 2 participants were asked to contact the Wellness Council Chair if they were interested in participating in the study rather than contacting the researcher. Again, this simple step helped to build confidence and trust, which ultimately helped in increasing participant recruitment.

Intervention Duration

The original ALED intervention was designed to be 20 weeks long (Dunn, Marcus, Kampert, Garcia, Kohl, et al. 1999). Later studies revealed shorter durations of ALED had similar effects as the 20-week curriculum (Wilcox, Dowda, Leviton, Bartlett-Prescott, Hazzarre, et al., 2008). One of this study's purposes was to analyze the effectiveness of an even ALED program, one of a 6-week length duration.

While no significant changes were seen in physical activity levels, other changes were similar to both the 20-week and 12-week curriculums. Participants did progress in the stages of change and also improved several of their processes of change and self-efficacy. Participants also noted more perceived benefits to physical activity than barriers. Participants in the CUMTD study also reported having more functionality and empowerment, which correspond with findings from

other studies (Baruth & Wilcox, 2011; Baruth, Wilcox, Wegley, Buchner, Ory, et al., 2010). CUMTD employees self-reported lower blood glucose levels, lower cholesterol levels, and lower body weights after participating in the program, which are similar to findings from the original Project Active study (Dunn, Marcus, Kampert, Garcia, Kohl, et al, 1999) and an internet-based version of ALED (Carr, Bartee, Dorozynski, Broomfield, Smith, et al., 2008).

There were mixed opinions from participants, however, regarding the length of the intervention. While many believed the intervention length was appropriate, especially with the targeted population, others believed adding an additional week or two may have helped them. One individual stated, "By the time I was starting to think and really buy into what you were saying, the program was over." Other participants wanted a booster class to be held three to six months after the original class to help with accountability, support, and motivation. One individual who believed the 6 week intervention was not long enough and wanted a follow-up class stated, "Six weeks just didn't feel long enough. By the time I was actually thinking about doing some of the things, the class was over. Maybe do a 6 week class and then a refresher class a few months or weeks later?" One possible future research direction may include taking the evidence-based 12-week curriculum and dividing it into 2, 6-week programs, which are delivered 3 months or 6 months apart from one another. The first half would focus on cognitive changes while the second half would focus on behavioral changes.

The short duration of the intervention may also play a role in why significant changes were not seen in all the outcome measures. Several of these changes may require a longer period of time to change (e.g., self-efficacy or decisional balance), especially of individuals who are in contemplation or preparation stages. Despite the shortness of the intervention, there were some changes that were not captured by questions. One particular individual started the ALED program

because, “I really wanted to do this class so I could have more energy at the end of the day. I am just so tired by the time I get home but because I’ve been going and concentrating for such a long time, I can’t fall asleep. I wanted to learn more about physical activity and stress and health because I’m young but I feel like I’ve really aged a lot in these last few years. I want to be around for a long time, too.” Being around for a long time was particularly important for this individual as she was the primary breadwinner for her family of six and she realized if something happened to her and she was unable to work, there would be significant financial and emotional consequences not only to her, but her family, too. By the end of the study, she had met with Justin (the personal trainer) to develop a plan for her. She said, “It’s three times a week, for 45 minutes but I can do it before I have to report for my shift and it doesn’t take too much time away from my kids.” Not only had she changed her physical activity behaviors, but she was also changing what she was eating, too. Normally she would eat potato chips and fast food on the bus because it was convenient and cheap. At the end of the study, however, she was preparing her lunches at home and had invested in a small cooler to bring healthy snacks on the road with her. She had substituted cut apples, baby carrots, and string cheese for potato chips and fast food. Not only had she made these changes, but as the primary breadwinner and individual responsible for grocery shopping for her family, she had implemented these changes within her family, too. She was also encouraging her family to be physically active. She stated:

> My daughter wants to go on walks with me and next board I won’t need to be here till later three times a week so we can do that together. I know she’ll enjoy doing it. Right now, we’re trying out a videotape at home so that’s been fun for us.

This story is one of many, which demonstrates the impact the ALED intervention has had not only the CUMTD employees who participated in the program, but their other co-workers and their families, as well.

Despite the fact many community groups want a shorter version of ALED to be available for community-based implementation, this research demonstrated that a 6-week intervention is not as effective as either the 12-week or 20-week interventions. Although the 6-week intervention did demonstrate promising results, it did not lead to long-term changes, at least as assessed in this study. For this population, it is important to increase the intervention duration and/or add booster classes after the initial intervention. This recommendation is based on comments made by participants who recognized they were making cognitive changes but these cognitive changes were not translating into behavioral ones. The lack of significant changes in behaviors may be due to the shortness of the intervention. Future research studies may look at the dose-response affects of a longer intervention (e.g. does increasing intervention length result in significant behavioral changes?) on this population and/or may examine the effects of a "booster" program on the population's health behaviors.

Strengths

A major strength of this study was the inclusion of participants who are not generally involved in Department of Kinesiology and Community Health research. A significant portion of these participants could be classified as having lower educational attainment levels that may normally be seen at the university level. Despite having lower educational attainment levels, a large portion of these employees reported earning over $45,000 per year. Also, in this study, 13% of participants classified themselves as African-American. Forty-five percent of the participants in

this study were men while previous studies have had a preponderance of female participants (Wilcox, Dowda, Wegley, & Ory, 2009; Smith, Carr, Dorozynski, & Gomashe, 2009).

An additional strength of this study was the inclusion of a population that has not been traditionally studied extensively. Few studies have conducted a worksite wellness program with mass transit employees. Additionally, this study focused on implementation of a behavior change program with this unique population. The majority of worksite wellness research involving mass transit employees has focused primarily on changing the environment and policies of the worksite. This research study, however, focused on changing employees' behaviors so they would be more receptive to environmental and policy changes in the worksite, if and when they occurred. Mass transit employees, particularly bus operators, face one-of-a-kind barriers to healthy living because of the long work hours, shift work schedules, lack of scheduled breaks and meals, and lack of healthy food choices and physical activity options. Also, bus operators face different challenges because of working with the public on a constant basis and having performance reviews that are, in part, affected by complaints given by the public. One individual stated, "You feel pressure from the passengers – the public. Pretty soon, you're making little concessions you didn't realize you made – it becomes a bad, poor cycle." Also, because safety is paramount for this workforce, perhaps more so than other occupations, it is important that drivers and maintenance works, especially, be as physically and mentally fit as possible in order to best react in a dangerous situation. For drivers, particularly, they would not only have their lives at stake but the lives of their passengers, too. Because of these factors, the use of unique workforce, the mass transit population, was considered a strength of this study. Finally, this study utilized a methodology which has not been used with this population before. As part of the tailoring process, focus groups were conducted to tailor the ALED curriculum for mass transit employees. Focus groups were

conducted using the NGT, which has not been used with the mass transit population or with the tailoring of ALED curriculum materials.

Limitations

Based on the findings from this study, there were several limitations. All participants in this study were voluntary, thus, there was a large probability of participants to self-select into the intervention group. Additionally, all data obtained from the questionnaires were self-reported. Because questionnaire data was self-reported, there was a probability participants were compelled to provide socially desirable answers. Another critical limitation to this study was sample size. Phase 1, the non-tailored version, finished with 7 participants while Phase 2, the tailored version, finished with 19 participants. The small sample sizes greatly restrict the study's statistical power, which also influences a study's effect.

Another significant limitation to this study was issues with participant recruitment and retention, which greatly affected the study's sample sizes. Although 17 individuals expressed interest in Phase 1 of the study, only 7 of these individuals completed the study. For Phase 2, 32 individuals conveyed interest in the ALED program, but only 19 completed the study. Reasons given for not enrolling or completing the study included medical problems (e.g. scheduled surgery), work schedules (e.g. overtime), and distrust in the program (e.g. reporting of medical data to CUMTD administration). One individual remarked, "The 'newness' of the program worried some people. Some people were not wanting to join the program because they don't want administration to know about their health or anything, even though you say everything is confidential – they don't believe it completely. Now I know but I think if people don't know you, they might not trust you." Another factor influencing participant recruitment and retention included seasonal effect. Phase 1 occurred during late in the year, which affected recruitment and retention. For Phase 1, the

intervention started in October, which coincided with one of the busiest times of the CUMTD because the University of Illinois was in session. Additionally, Phase 1 post-intervention testing occurred during the holiday season, which may have impacted participants' physical activity, stress, and fatigue levels, among other health indicators. For Phase 2, there was an increase in participants, which may have been attributed to starting the intervention in January, which coincided with the New Year and people's resolutions. There was, however, participant attrition, which occurred as the University of Illinois was beginning to start their Spring semester. Also, although participants did not withdraw from the study, there was a significant decline in attendance as the University of Illinois's Spring semester went underway.

Future Research Directions

The researcher has several plans for future research based on the findings from this preliminary study. First, the researcher would like to amend the Institutional Review Board form, which was approved for this study, to include post-intervention follow-up. This follow-up period would be 6 months and 1 year from the conclusion of the study. The researcher is interested to determine whether significant findings from the pilot study remain significant at these time periods and to determine whether changes occur in the measures, which were deemed insignificant one week after the conclusion of the intervention.

Another future research plan would be to implement the ALED curriculum to the same population (CUMTD employees) during a different time period. The population used for this preliminary study worked in a university town, where a majority of their clients were affiliated with the university. Because of this, CUMTD's busies times of the year are from August to December and January to May. Both Phases of the preliminary study began and ended during this period, affecting recruitment, retention, and outcome variables. Starting the intervention in June, when a

majority of university students are gone, may have significant effects on participant recruitment, retention, and outcome variables. Additionally, starting the intervention during this time period may influence participants' physical activity levels since the weather is generally nicer during this time than it was during the periods of the preliminary study.

Another future research direction would be to implement the ALED curriculum in three different ways. ALED can be disseminated through in-person, online, or hybrid (in-person plus online) classes. For this study, ALED was disseminated only through an in-person setting. Due to the unique nature of the mass transit population, however, it may be useful to study the effects of the different intervention approaches on physical activity changes and other health outcomes.

One of the most useful and successful recruiting techniques used in Phase 2 was to use a testimonial from a Phase 1 participant for recruitment. Phase 2 participants stated they were more willing to join a program based on their fellow co-worker's testimonial. Because of the importance of peer influence in this type of population, it may be prudent to investigate the effects of a peer-led ALED program with this population. Peer educators could be used to co-facilitate the program with a trained ALED facilitator.

Previous studies studying mass transit populations have focused primarily on social and environmental factors. The mass transit populations' social and environmental factors have played a significant role in contributing to this populations' physical inactivity, poor nutrition, and overweight and obesity incidence rates. Because social and environmental factors are greatly influential to this population's health behaviors, it may be prudent to see how changes in social and environmental factors coupled with implementation of an evidence-based behavior change program affects employees' health statuses. Another future research project may include combining the evidence-based program, ALED, along with social and environmental changes, such as changing

work schedules, offering healthy food choices in the lounges, and providing physical activity opportunities for off-site operators.

Finally, another research project would be to implement the ALED curriculum with a similar population. The CUMTD provides service to a university town, serving a majority of university-affiliated individuals, and whose busies periods of service are when the university are in session. The next logical step would be to implement ALED with another mass transit district serving a similar population with similar characteristics.

Conclusion

As adult overweight and obesity rates climb, it is imperative that businesses become invested in their employees' health. It has been well-documented that people are spending more time at work, and that the workplace significantly influences the health choices of individuals (Wilson, Holman, & Hammock, 1996). This study examined the effects of an abbreviated, evidence-based physically activity curriculum on mass transit employees' physical activity behaviors, decisional balance, processes of change, self-efficacy, physical and mental health, fatigue, sleep quality, perceived stress, abilities to complete activities of daily live, feelings during physical activity, and physical activity enjoyment. This study also looked at the effects of a tailored intervention on these measures versus a non-tailored intervention.

Based on the findings from the study, the non-tailored intervention had statistically significant effects on the following measures: caring about consequences to others, increasing healthy opportunities, committing oneself, and reminding oneself. These measures were all part of the processes of change. The tailored intervention had statistically significant effects on decisional balance, increasing healthy opportunities, substituting alternatives, rewarding oneself, reminding oneself, sleep quality, participants' feelings about physical activity, physical activity enjoyment,

perceived stress, reduced motivation, and the SF-36. Comparing post-intervention scores for the non-tailored and tailored interventions, only significant differences were found increasing healthy opportunities and physical fatigue. Because the significant differences were found only in two of the twenty-four measures analyzed, it may not be prudent to spend time and resources to tailor the ALED intervention specifically to the mass transit population. It may be wise, however, to be sure to include examples specific to this population alongside the examples given in the ALED curriculum.

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APPENDIX A: FORMS AND QUESTIONNAIRES FOR PARTICIPANTS

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"The Use and Tailoring of an Evidence-Based Physical Activity Behavior Change Program in a Unique Worksite Population"

Informed Consent Form

You have been invited to participate in a study entitled "The Use and Tailoring of an Evidence-Based Physical Activity Behavior Change Program in a Unique Worksite Population." This research study is being conducted by Bhibha M. Das, MPH under the direction of Dr. Steven Petruzzello of the Department of Kinesiology and Community Health at the University of Illinois at Urbana-Champaign. This research study's purpose is to examine the impact of a physical activity behavior change program on Champaign-Urbana Mass Transit District (CUMTD) employees' physical activity levels, stress indicators, and fatigue indicators.

Procedure:

Your voluntary participation in this research study requires attending 6 one-hour classes at the CUMTD campus. Classes will meet once a week, for an hour, for 6 weeks at the CUMTD campus. The class, which is based on the Active Living Every Day program, will cover topics including barriers to physical activity, benefits of physical activity, and gaining confidence to complete physical activity. There is a chance that you may not be able to participate in the initial class offering because of size constraints. *If that happens, you have the option of being placed on a waiting list. We would still like to gather information from you during this time, but you would not actually get the program information until the second class begins in January. If you end up on the waiting list, you would have the first option of participating in the class in January.* Additionally, you have the option of choosing to participate in a focus group, which will likely last 45-60 minutes, after the completion of the 6-week class.

You will be asked to complete a demographic information form, which will collect information on your sex, age, occupational category, race, marital status, educational level, and income level. You will also be asked to complete a medical history form and questionnaires asking you about your fatigue level, stress level, and other health indicators. These questionnaires will be completed before the class, 4 weeks into the class, and at the end of the class. You will also be asked to complete a short bout of physical activity in the first week of the intervention and the last week of the intervention. While completing the bout of physical activity, you will be asked to rate your feelings on a Feelings Scale, which will be provided for you. After completing the bout of physical activity, you will be asked to rate your feelings on a Physical Activity Enjoyment Scale, which will also be provided for you.

If you choose to be part of the focus group, you will be part of a 5 to 8 person group. The researchers will ask you and the rest of the group several questions which will assess the effectiveness of the intervention and determine what changes need to be made to adequately meet the needs of the CUMTD workforce. You do not have to answer any questions that you do not feel comfortable answering. The focus group is a four-step process, which takes advantage of shared opinions. In the first step, each person in the group will write down their answers to the questions. In the next step, group members will participate in a round-robin feedback session. In the third step, each recorded idea will be discussed to clarify and evaluate the idea. Finally, each individual will vote on the priority of the ideas, or themes, and then a mutual decision is based on the vote. The focus group will be audio-recorded so that we can be sure to accurately capture the opinions of the group members. The audiotapes will be transcribed immediately following the session and then they will be destroyed. If you agree to participate in this part of the study, we request that you not discuss with anyone anything that was said by other participants in the focus group.

Please check one of the following options regarding focus group participation:

_____ I would like to be considered for the follow-up focus group.
_____ I DO NOT want to be part of the follow-up focus group.

Risk:

There is a very low risk of injury to you by participating in this study. There is no greater probability or magnitude of risk than the risks ordinarily encountered in everyday daily life. However, beginning an exercise program may bring about some soreness in muscles that haven't been used for a while. This shouldn't last more than a few days at most, and is most likely at the beginning of the program.

Benefits:

The data collected from this study will be used to enhance the worksite wellness initiatives at the Champaign-Urbana Mass Transit District campus. Data collected from this study may also be useful in helping to inform other mass transit districts of ways to improve their worksite wellness programs. Additionally, the data can help determine how programs can be tailored to meet the needs of a mass transportation workforce. Data collected from the study will also help determine the effectiveness of changing the Active Living Every Day intervention duration. These data can help determine effective intervention lengths of the Active Living Every Day program, which can help community groups disseminate the program more efficiently.

Compensation:

There is no compensation for this study. The University of Illinois does not provide medical or hospitalization insurance coverage for participants in this research study nor will the University of Illinois provide compensation for any injury sustained as a result of participation in this research study, except as required by law.

Voluntary Participation/Withdrawal:

You may withdraw from this study at any time without penalty. You also have the right to ask to have your portion of the focus group erased from the digital tape and the written transcript (a transcript of your participation in the focus group will be sent for you to review and you have 1 week to inform researchers if you want any specific section or all of your participation deleted). The decision to participate, decline, or withdraw participation will have no effect on your relationship with the University of Illinois at Urbana-Champaign. You have been given an opportunity to ask questions concerning the information given to you. Please contact Dr. Steven Petruzzello or Ms. Bhibha Das with any questions or concerns about the research. You may contact Dr. Steven Petruzzello at (217) 244-7325 (office), petruzze@illinois.edu or Ms. Bhibha Das at (217) 390-8156 (home), bdas@illinois.edu if you have any questions or concerns about this research. If you have any questions about your rights as a participant in this study, please contact the University of Illinois Institutional Review Board at 217-333-2670 (please feel free call the IRB collect if a long distance number for you, identify yourself as a research participant when placing the call),or via email at irb@illinois.edu.

Confidentiality:

The information obtained in this research will be treated as confidential and will not be released to any person without your expressed written consent. The researchers will keep the participants' responses confidential, however, complete confidentiality cannot be guaranteed since members of the focus group may share what was said during the focus group session with others outside the group. The information obtained from this study may be used for a statistical or scientific purpose with your right of privacy upheld.

Your Understanding of this Research Study:

When you sign this document, you are stating that the study has been fully explained to you, you have had an opportunity to ask questions, and that you understand that the data obtained from this study are to be used for research purposes only, not for the evaluation or diagnosis of any disorder or disease, and that such data will remain confidential, except as required by law. The individual information that you provide as part of this experiment will not be disseminated in any manner that may identify you. However, information from this experiment may be disseminated in journal articles, theses, and conference presentations.

In the event of physical injury resulting from this research study, immediate medical treatment is available from a number of health care providers in the area. However, the University of Illinois does not provide medical or hospitalization insurance coverage for participants in this research study nor will the University of Illinois provide compensation for any injury sustained as a result of participation in this research study, except as required by law. The cost of any visit to a physician is at the subject's own expense.

You will be given a copy of this consent form for your records. If at any time, either now or later, you have a question, you are free to ask. You can contact a researcher listed at the top of this consent form, who is responsible for this study. If you wish to speak with someone specifically about complaints or concerns regarding *rights as a participant* in this study, you may contact the

University of Illinois Institutional Review Board (217) 333-2670 which may be called collect if needed (E-mail: irb@illinois.edu).

_____	_____
Signature of member of Research Team	Date
_____	_____
Signature of Research Participant	Date
_____	_____
Printed Name of Research Participant	E-mail & Campus or Cell Phone Number

_____

Mailing Address

University of Illinois at Urbana-Champaign

Department of Kinesiology and Community Health
College of Applied Health Sciences
Louise Freer Hall
906 South Goodwin Avenue
Urbana, IL 61801-3895

"The Use and Tailoring of an Evidence-Based Physical Activity Behavior Change Program in a Unique Worksite Population"

Informed Consent Form

You have been invited to participate in a study entitled "The Use and Tailoring of an Evidence-Based Physical Activity Behavior Change Program in a Unique Worksite Population." This research study is being conducted by Bhibha M. Das, MPH under the direction of Dr. Steven Petruzzello of the Department of Kinesiology and Community Health at the University of Illinois at Urbana-Champaign. This research study's purpose is to examine the impact of a physical activity behavior change program on Champaign-Urbana Mass Transit District (CUMTD) employees' physical activity levels, stress indicators, and fatigue indicators.

Procedure:

Your voluntary participation in this research study requires attending one of the following 1) 6 one-hour classes at the CUMTD campus, 2) 7 one-hour classes at the CUMTD campus, or 3) 8 one-hour classes at the CUMTD campus. You will be randomly assigned to the 6-week program, 7-week program, or 8 week program. These classes will cover topics including barriers to physical activity, benefits of physical activity, and gaining confidence to complete physical activity. There is a chance that you may not be able to participate in the initial class offering because of size constraints. *If that happens, you have the option of being placed on a waiting list. We would still like to gather information from you during this time, but you would not actually get the program information until the second class begins in late Fall 2011. If you end up on the waiting list, you would have the first option of participating in the class in late Fall 2011.* Additionally, you have the option of choosing to participate in a focus group, which will likely last 45-60 minutes, after the completion of the class.

You will be asked to complete a demographic information form, which will collect information on your sex, age, occupational category, race, marital status, educational level, and income level. Also, you will be asked to complete a medical history form. You will also be asked to complete questionnaires asking you about your fatigue level, stress level, and other health indicators. These questionnaires will be completed before the class, 4 weeks into the class, and at the end of the class. You will also be asked to complete a short bout of physical activity in the first week of the intervention and the last week of the intervention. While completing the bout of physical activity, you will be asked to rate your feelings on a Feelings Scale, which will be provided for you. After completing the bout of physical activity, you will be asked to rate your feelings on a Physical Activity Enjoyment Scale, which will also be provided for you.

If you choose to be part of the focus group, you will be part of a 5 to 8 person focus group. The researchers will ask you and the rest of the group several questions. These questions will assess the effectiveness of the intervention and determine what changes need to be made to adequately meet the needs of the CUMTD workforce. You do not have to answer any questions that you do not feel comfortable answering. The focus group is a four-step process, which takes advantage of shared opinions. In the first step, each person in the group will write down their answers to the questions. In the next step, group members will participate in a round-robin feedback session. In the third step, each recorded idea will be discussed to clarify and evaluate the idea. Finally, each individual will vote on the priority of the ideas, or themes, and then a mutual decision is based on the vote. The focus group will be audio-recorded. If you agree to participate in this study, we request that you do not discuss with anyone anything that was said by other participants in the focus group.

Please check one of the following options regarding focus group participation:

_____ I would like to be considered for the follow-up focus group.
_____ I DO NOT want to be part of the follow-up focus group.

Risk:

There is a very low risk of injury to you. There is no greater probability or magnitude of risk than the risks ordinarily encountered in everyday daily life. However, beginning an exercise program may bring about some soreness in muscles that haven't been used for a while. This shouldn't last more than a few days at most, and is most likely at the beginning of the program.

Benefits:

The data collected from this study will be used to enhance the worksite wellness initiatives at the Champaign-Urbana Mass Transit District campus. Data collected from this study may also be useful in helping to inform other mass transit districts of ways to improve their worksite wellness programs. Additionally, the data can help determine how programs can be tailored to meet the needs of a mass transportation workforce. Data collected from the study will also help determine the effectiveness of changing the Active Living Every Day intervention duration. These data can help determine effective intervention lengths of Active Living Every Day, which can help community groups disseminate the program more efficiently.

Compensation:

There is no compensation for this study. The University of Illinois does not provide medical or hospitalization insurance coverage for participants in this research study nor will the University of Illinois provide compensation for any injury sustained as a result of participation in this research study, except as required by law.

Voluntary Participation/Withdrawal:

You may withdraw from this study at any time without penalty. You also have the right to ask to have your portion of the focus group erased from the digital tape and the written transcript (a

transcript of your participation in the focus group will be sent for you to review and you have 1 week to inform researchers if you want any specific section or all of your participation deleted). The decision to participate, decline, or withdraw participation will have no effect on your relationship with the University of Illinois at Urbana-Champaign. You have been given an opportunity to ask questions concerning the information given to you. Please contact Dr. Steven Petruzzello or Ms. Bhibha Das with any questions or concerns about the research. You may contact Dr. Steven Petruzzello at (217) 244-7325 (office), petruzze@illinois.edu or Ms. Bhibha Das at (217) 390-8156 (home), bdas@illinois.edu if you have any questions or concerns about this research. If you have any questions about your rights as a participant in this study, please contact the University of Illinois Institutional Review Board at 217-333-2670 (please feel free call the IRB collect if a long distance number for you, identify yourself as a research participant when placing the call),or via email at irb@illinois.edu.

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Your Understanding of this Research Study:

When you sign this document, you are stating that the experiment has been fully explained to you, you have had an opportunity to ask questions, and that you understand that the data obtained from this study are to be used for research purposes only, not for the evaluation or diagnosis of any disorder or disease, and that such data will remain confidential, except as required by law. The individual information that you provide as part of this experiment will not be disseminated in any manner that may identify you. However, information from this experiment may be disseminated in journal articles, theses, and conference presentations.

In the event of physical injury resulting from this research study, immediate medical treatment is available from a number of health care providers in the area. However, the University of Illinois does not provide medical or hospitalization insurance coverage for participants in this research study nor will the University of Illinois provide compensation for any injury sustained as a result of participation in this research study, except as required by law. The cost of any visit to a physician is at the subject's own expense.

You will be given a copy of this consent form for your records. If at any time, either now or later, you have a question, you are free to ask. You can contact a researcher listed at the top of this consent form, who is responsible for this study. If you wish to speak with someone specifically about complaints or concerns regarding *rights as a participant* in this study, you may contact the University of Illinois Institutional Review Board (217) 333-2670 which may be called collect if needed (E-mail: irb@illinois.edu).

_____	_____
Signature of member of Research Team	Date
_____	_____
Signature of Research Participant	Date
_____	_____
Printed Name of Research Participant	E-mail & Campus or Cell Phone Number
_____	
Mailing Address	

Health History and Demographics Questionnaire

CUMTD Active Living Every Day

ID#

Date of Birth: _____

Height: _____

Weight: _____

Sex: _____

Age: _____

Demographics	
Are you currently married?	☐ Yes ☐ No *If no, please specify:* ☐ Never married ☐ Living with partner ☐ Widowed ☐ Separated ☐ Divorced ☐ Other
How many years have you been in your current marital situation?	_____ years
How many times have you been married? *(If you have never been married, please write "0".)*	_____ times

What is your race? *(Please specify all categories that apply.)*	☐ Asian/Pacific ☐ Black ☐ Hispanic ☐ Indian/Alaskan ☐ White
Do you have a religious affiliation?	☐ Yes ☐ No *If yes, please specify affiliation:*
If there is a religious affiliation, to what extent are the customs and practices followed?	☐ Sometimes ☐ Frequently ☐ Always ☐ Not applicable

How many years of education have you completed?

	Number of years attended	Degree?	Specify the major area of study
Elementary (grades 1-8)	_____ years	Yes No	
High school (grades 9-12)	_____years	Yes No	
Vocational/Technical School	_____years	Yes No	
2-year College	_____years	Yes No	
4 –year College	_____years	Yes No	
Graduate School	_____years	Yes No	
Professional School	_____years	Yes No	

What is your current employment status?

☐	Full time – working at least 35 hours/week
☐	Part time – working less than 35 hours/week
☐	Laid-off or unemployed, but looking for work
☐	Laid-off or unemployed, but not looking for work
☐	Retired, not working at all
☐	Retired, working part-time
☐	Disabled
☐	Full time homemaker
☐	Other, *please specify:* _____

What is your primary occupation (the one you work most hours a week)? If you are retired and not working, what WAS your primary occupation?

Do you have any children?	☐ Yes ☐ No *If yes, please specify how many:*
How many people live in your household including yourself?	_____ adults (at least 18 years of age) _____ children (less than 18 years of age)

Other than yourself and your spouse or significant other, please describe any additional household members:

Children	Age(s)
Grandchildren	Age(s)
Other relatives	Age(s)
Other non-relatives	Age(s)

What is your total gross household annual income (before taxes and deductions)?

☐	$0-$14,999
☐	$15,000-$29,999
☐	$30,000-$44,999
☐	$45,000-$59,999
☐	$60,000-$74,999
☐	$75,000-$89,999
☐	$90,000 and above
☐	I choose not to answer

Medications: *Please indicate if you take the following medicine or drugs, and list all other medicines or drugs you presently take and include the amount taken (dosage) and how often. Please include over-the-counter medicines as well as prescription medicine.*

Medicine/Drug Name	**Dosage (units)**	**Frequency Taken (i.e. 2/week, 1/week)**
Anti-inflammatory drugs (e.g. aspirin, ibuprofen)		
Statins (e.g. Lipitor, Crestor, Mevacor, Vytorin)		
Hypothyroidism drugs (e.g. Synthroid)		

Supplements: *Please indicate if you take the following supplements. List all additional supplements you presently take and include the amount taken (dosage) and how often.*

Supplement Name/Type	**Dosage (units)**	**Frequency Taken (i.e. 2/week, 1/week)**
One-A-Day multivitamin which contains calcium	Calcium:	
One-A-Day multivitamin which contains calcium + vitamin D	Calcium: Vitamin D:	
Calcium supplement	Calcium:	
Calcium + vitamin D supplement	Calcium: Vitamin D:	

Some conditions may impact physical testing or study outcomes. Please indicate the symptoms that you have experienced by circling **Yes** or **No.** If answering **Yes** to any question, provide date of onset if known. Please list any additional information that you believe may be helpful in evaluating your medical and health history in the space provided in Question #57.

Cardiovascular Health History		
Have you experienced any of the following:		
1.	Pain or discomfort in the chest, neck, jaw, arms or other areas that may be related to poor circulation	**Yes** **No** *Date __/____*
2.	Heartbeats or palpitations that feel more frequent or forceful than usual or feeling that your heart is beating very rapidly	**Yes** **No** *Date __/____*
3.	Unusual dizziness or fainting	**Yes** **No** *Date __/____*
4.	Shortness of breath while lying flat or a sudden difficulty in breathing that wakes you up while you are sleeping	**Yes** **No** *Date __/____*
5.	Ankle swelling unrelated to injury	**Yes** **No** *Date __/____*
6.	Shortness of breath at rest or with mild exertion (like walking two blocks)	**Yes** **No** *Date __/____*
7.	Feeling lame or pain in your legs brought on by walking	**Yes** **No** *Date __/____*
8.	A known heart murmur	**Yes** **No** *Date __/____*
9.	Unusual fatigue with usual activities	**Yes** **No** *Date __/____*

General Medical & Health History		
10.	How many times per week do you engage in moderate to strenuous exercise? (i.e. working hard enough to break a sweat and/or breathing so hard you are unable to carry on a conversation while exercising)	**_____ times/week**
11.	Have you ever had a serious allergic reaction to eggs or a serious reaction to a previous dose of influenza vaccine?	**Yes No**
12.	Do you have a history of Guillain-Barré Syndrome (GBS)?	**Yes No**
13.	Have you ever been diagnosed with heart disease?	**Yes No**
14.	Do you have any significant disorders of heart rhythm?	**Yes No**
15.	If you answered Yes to the last question, is it a chronic disorder?	**Yes No**
16.	Do you have high blood pressure?	**Yes No**
17.	Have you been diagnosed with peripheral vascular disease (i.e. atherosclerosis, often called hardening of the arteries)?	**Yes No**
18.	Have you been diagnosed with a pulmonary disease such as asthma or emphysema?	**Yes No**
19.	Have you ever had seizures?	**Yes No**
20.	Do you have arthritis? If so, please explain:	**Yes No**
21.	Are you diabetic? If so, please explain:	**Yes No**
22.	Have you been diagnosed with any kind of cancer? If so, please explain:	**Yes No**
23.	Do you have ulcers?	**Yes No**

24.	Do you have osteoporosis?	**Yes** **No**
25.	If you answered Yes to the last question, is the osteoporosis severe enough that you need to limit your physical activity or not engage in specific activities (i.e., doing crunches, bending at the waist, twisting stretches, straight leg lifts)?	**Yes** **No**
26.	Do you have a hearing loss or wear a hearing aid?	**Yes** **No**
27.	Do you have any food or drug allergies? If so, please list your allergies:	**Yes** **No**
28.	Do you have any problems with your vision? If so, explain:	**Yes** **No**
29.	Have you had an organ transplant?	**Yes** **No**
30.	Have any of your organs been removed (e.g. spleen, other)? If so, please explain:	**Yes** **No**
31.	Do you often experience urinary incontinence? If so, how often?	**Yes** **No**
32.	Do you have any significant thyroid or other endocrine or hormone abnormality?	**Yes** **No**
33.	Have you had any recent vaccinations other than those listed? If so, please list the vaccinations you have received and the date (if known) that you received them:	**Did you have last year's influenza vaccine** Yes / No / Unsure **Date of last tetanus toxoid booster if known** __ / _____ *month* *year*

34.	Have you had any recent illnesses? If so, please explain:	**Yes** **No**
35.	Have you been hospitalized within the last six months? If so, please explain:	**Yes** **No**
36.	Have you had any surgical procedures within the last six months? If so, please explain:	**Yes** **No**
37.	Have you recently received antibiotics? If so, please explain:	**Yes** **No**
38.	Do you regularly take non-steroidal anti-inflammatory drugs such as aspirin or ibuprophen? If so, please explain:	**Yes** **No**
39.	Do you have varicose veins?	**Yes** **No**

Other Habits		
1.	How many cups of caffeinated coffee do you have daily?	
2.	How many caffeinated soft drinks do you have daily?	
3.	How many cups of tea do you have daily?	
4.	How many cans of beer do you have weekly?	
5.	How many glasses of wine do you have weekly?	
6.	How many ounces of liquor do you have weekly?	
7.	How many cigarettes do you smoke daily?	
8.	How many cigars or pipes do you smoke daily?	
9.	If you are an ex-smoker, how many years since you quit?	
10.	How often would you rate your stress level as high?	Rarely Occasionally Frequently Constantly *(circle one)*
11.	Do you wear dentures?	
12.	Do you wear glasses?	
Family History		
13.	Has any **male** in your immediate family had a heart attack or sudden death before the age of 55? If so, what relation is this person to you?	**Yes** **No**
14.	Has any **female** in your immediate family had a heart attack or sudden death before the age of 65? If so, what relation is this person to you?	**Yes** **No**
15.	Do you have a family history of heart disease? If so, what relation is this person to you?	**Yes** **No**
16.	Do you have a family history of lung disease? If so, what	**Yes** **No**

	relation is this person to you?	
17.	Do you have a family history of strokes? If so, what relation is this person to you?	**Yes** **No**
18.	Please list anything else you feel we should know about you and your current/past health:	

Physician Clearance Form

Dr. _____
(please print)
the attending physician of _____
(please print)

Your patient has expressed interest in participating in "The Use and Tailoring of an Evidence-Based Physical Activity Behavior Change Program in a Unique Worksite Population" conducted at the Champaign Urbana Mass Transit District (CUMTD) by Bhibha M. Das, MPH, a doctoral student in the Department of Kinesiology and Community Health at the University of Illinois. This research study's purpose is to examine the impact of an evidence-based physical activity behavior change program in creating changes in physical activity and behavior in CUMTD employees.

Your patient will attend 6 45-minute, in-person classes to learn more about physical activity behavior and barriers to physical activity.

As part of the study, your patient will be asked to complete 2 bouts of physical activity. One bout at the beginning of the study and another at the end of the study. The bouts of physical activity will be moderate intensity. These bouts of physical activity will be used to complete the Feelings Scale and Physical Activity Enjoyment Scale.

I have reviewed my patient's health history and I believe my patient to be capable of safely participating in a physical activity program.

Signature _____ Date _____

Thank you for taking time to read this summary and evaluate your patient's status for participation in this study. If you have additional questions, please call Bhibha Das, at (217) 390-8156 or email bdas@illinois.edu.

Please fax the completed form to 217-333-3266.

Physical Activity Readiness
Questionnaire - PAR-Q
(revised 2002)

PAR-Q & YOU

(A Questionnaire for People Aged 15 to 69)

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is very safe for most people. However, some people should check with their doctor before they start becoming much more physically active.

If you are planning to become much more physically active than you are now, start by answering the seven questions in the box below. If you are between the ages of 15 and 69, the PAR-Q will tell you if you should check with your doctor before you start. If you are over 69 years of age, and you are not used to being very active, check with your doctor.

Common sense is your best guide when you answer these questions. Please read the questions carefully and answer each one honestly: check YES or NO.

YES	NO	
☐	☐	**1. Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?**
☐	☐	**2. Do you feel pain in your chest when you do physical activity?**
☐	☐	**3. In the past month, have you had chest pain when you were not doing physical activity?**
☐	☐	**4. Do you lose your balance because of dizziness or do you ever lose consciousness?**
☐	☐	**5. Do you have a bone or joint problem (for example, back, knee or hip) that could be made worse by a change in your physical activity?**
☐	☐	**6. Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?**
☐	☐	**7. Do you know of any other reason why you should not do physical activity?**

If you answered

YES to one or more questions

Talk with your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.

- You may be able to do any activity you want — as long as you start slowly and build up gradually. Or, you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.
- Find out which community programs are safe and helpful for you.

NO to all questions

If you answered NO honestly to all PAR-Q questions, you can be reasonably sure that you can:

- start becoming much more physically active – begin slowly and build up gradually. This is the safest and easiest way to go.
- take part in a fitness appraisal – this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively. It is also highly recommended that you have your blood pressure evaluated. If your reading is over 144/94, talk with your doctor before you start becoming much more physically active.

→ **DELAY BECOMING MUCH MORE ACTIVE:**

- if you are not feeling well because of a temporary illness such as a cold or a fever – wait until you feel better; or
- if you are or may be pregnant – talk to your doctor before you start becoming more active.

PLEASE NOTE: If your health changes so that you then answer YES to any of the above questions, tell your fitness or health professional. Ask whether you should change your physical activity plan.

Informed Use of the PAR-Q: The Canadian Society for Exercise Physiology, Health Canada, and their agents assume no liability for persons who undertake physical activity, and if in doubt after completing this questionnaire, consult your doctor prior to physical activity.

No changes permitted. You are encouraged to photocopy the PAR-Q but only if you use the entire form.

NOTE: If the PAR-Q is being given to a person before he or she participates in a physical activity program or a fitness appraisal, this section may be used for legal or administrative purposes.

"I have read, understood and completed this questionnaire. Any questions I had were answered to my full satisfaction."

NAME _____

SIGNATURE _____ DATE _____

SIGNATURE OF PARENT _____ WITNESS _____
or GUARDIAN (for participants under the age of majority)

Note: This physical activity clearance is valid for a maximum of 12 months from the date it is completed and becomes invalid if your condition changes so that you would answer YES to any of the seven questions.

Supported by: Health Canada Santé Canada

Physical Activity Stages of Change

For each of the following questions, please circle YES or NO. Please be sure to read the questions carefully. Physical activity or exercise includes activities such as walking briskly, jogging, bicycling, swimming, or any other activity in which the exertion is at least as intense as these activities.

	NO	YES
1. I am currently physically active.	0	1
2. I intend to become more physically active in the next 6 months.	0	1
For activity to be *regular*, it must add up to a *total* of 30 minutes or more per day and be done at least 5 days per week. For example, you could take one 30-minute walk or take three 10-minute walks for a daily total of 30 minutes.		
3. I currently engage in *regular* physical activity.	0	1
4. I have been *regularly* physically active for the past 6 months	0	1

ACCELEROMETER LOG

As a participant in this program, we ask that you wear your Activity Monitor for a period of seven days. Please begin wearing the monitor on the **Requested Start Date**. If you start late or skip a day for any reason, please wear the monitor for an extra day so that you wear it for a full seven days.

Requested Start Date: ____/__/___ ___When you get up__
Requested End Date: ____/__/___ __When you go to bed_

Please record the actual dates/times you wore the accelerometer in the table below.

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Date							
Time of day you put on the unit							
Time of day you took off the unit							
Any time you did not wear the unit? (e.g. naps)							

In the space provided below, please provide comments about problems that occurred while you were wearing the units.
Please contact Bhibha Das at bdas@illinois.edu if you have any questions about your accelerometer.

Decisional Balance

Physical activity or exercise includes activities such as walking briskly, jogging, bicycling, swimming, and any other activity in which the exertion is at least as intense as these activities.

Please rate how important each of these statements is in your decision of whether to be physically active. In each case, think about how you feel **right now**, not how you have felt in the past or would like to feel.

Scale

1 = not at all important

2 = slightly important

3 = moderately important

4 = very important

5 = extremely important

1. I would have more energy for my family and friends if I were regularly physically active.

1 2 3 4 5

2. Regular physical activity would help me relieve tension.

1 2 3 4 5

3. I think I would be too tired to do my daily work after being physically active.

1 2 3 4 5

4. I would feel more confident if I were regularly physically active.

1 2 3 4 5

5. I would sleep more soundly if I were regularly physically active.

1 2 3 4 5

6. I would feel good about myself if I kept my commitment to be regularly physically active.

1 2 3 4 5

7. I would find it difficult to find a physical activity that I enjoy and that is not affected by bad weather.

1 2 3 4 5

8. I would like my body better if I were regularly physically active.

1 2 3 4 5

9. It would be easier for me to perform routine physical tasks if I were regularly physically active.

1 2 3 4 5

10. I would feel less stressed if I were regularly physically active.

1 2 3 4 5

11. I feel uncomfortable when I am physically active because I get out of breath and my heart beats very fast.

1 2 3 4 5

12. I would feel more comfortable with my body if I were regularly physically active.

1 2 3 4 5

13. Regular physical activity would take too much of my time.

1 2 3 4 5

14. Regular physical activity would help me have a more positive outlook on life.

1 2 3 4 5

15. I would have less time for my family and friends if I were regularly physically active.

1 2 3 4 5

16. At the end of the day, I am too exhausted to be physically active.

1 2 3 4 5

Processes of Change

Physical activity or exercise includes activities such as walking briskly, jogging, bicycling, swimming, and any other activity in which the exertion is at least as intense as these activities.

The following experiences can affect the exercise habits of some people. Think of any similar behaviors you may currently have or have had during the **past month**. Then rate how frequently the behavior occurs. Please circle the number that best describes your answer for each experience.

How frequently does this occur?

1= never

2= seldom

3= occasionally

4= often

5 = repeatedly

1. Instead of remaining inactive, I engage in some physical activity.

1 2 3 4 5

2. I tell myself I am able to be physically active if I want to.

1 2 3 4 5

3. I put things around my home to remind me to be physically active.

1 2 3 4 5

4. I tell myself that if I try hard enough, I can be physically active.

1 2 3 4 5

5. I recall information people have personally given me on the benefits of physical activity.

1 2 3 4 5

6. I make commitments to be physically active.

1 2 3 4 5

7. I reward myself when I am physically active.

1 2 3 4 5

8. I think about information from articles and advertisements on how to make physical activity a regular part of my life.

1 2 3 4 5

9. I keep things around my place of work that remind me to be physically active.

1 2 3 4 5

10. I find society changing in ways that make it easier to be physically active.

1 2 3 4 5

11. Warnings about the health hazards of inactivity affect me emotionally.

1 2 3 4 5

12. Dramatic portrayals of the evils of inactivity affect me emotionally.

1 2 3 4 5

13. I react emotionally to warnings about an inactive lifestyle.

1 2 3 4 5

14. I worry that inactivity can be harmful to my body.

1 2 3 4 5

15. I am considering the idea that regular physical activity would make me a healthier, happier person to be around.

1 2 3 4 5

16. I have someone I can depend on when I am having problems with physical activity.

1 2 3 4 5

17. I read articles about physical activity in an attempt to learn more about it.

1 2 3 4 5

18. I try to set realistic physical activity goals for myself rather than set myself up for failure by expecting too much.

1 2 3 4 5

19. I have a healthy friend who encourages me to be physically active when I don't feel up to it.

1 2 3 4 5

20. When I am physically active, I tell myself that I am being good to myself by taking care of my body.

1 2 3 4 5

21. The time I spend being physically active is my special time to relax and recover from the day's worries, not a task to get out of the way.

1 2 3 4 5

22. I am aware of more and more people encouraging me to be physically active these days.

1 2 3 4 5

23. I do something nice for myself for making efforts to be more physically active.

1 2 3 4 5

24. I have someone who points out my rationalizations for not being physically active.

1 2 3 4 5

25. I have someone who provides feedback about my physical activity.

1 2 3 4 5

26. I remove things that contribute to my inactivity.

1 2 3 4 5

27. I am the only one responsible for my health, and only I can decide whether or not I will be physically active.

1 2 3 4 5

28. I look for information related to physical activity.

1 2 3 4 5

29. I avoid spending long periods of time in environments that promote inactivity.

1 2 3 4 5

30. I feel that I would be a better role model for others if I were regularly physically active.

1 2 3 4 5

31. I think about the type of person I would be if I were physically active.

1 2 3 4 5

32. I notice that more businesses are encouraging their employees to be physically active by offering fitness courses and time off to work out.

1 2 3 4 5

33. I wonder how my inactivity affects those people who are close to me.

1 2 3 4 5

34. I realize that I might be able to influence others to be healthier if I would be more physically active.

1 2 3 4 5

35. I get frustrated with myself when I am not physically active.

1 2 3 4 5

36. I am aware that many health clubs now provide babysitting services to their members.

1 2 3 4 5

37. Some of my close friends might be more physically active if I were.

1 2 3 4 5

38. I consider the fact that I would feel more confidence in myself if I were more regularly physically active.

1 2 3 4 5

39. When I feel tired, I make myself be physically active anyway because I know I will feel better afterward.

1 2 3 4 5

40. When I'm feeling tense, I find physical activity is a great way to relive my worries.

1 2 3 4 5

Confidence

Physical activity or exercise includes activities such as walking briskly, jogging, bicycling, swimming, and any other activity in which the exertion is at least as intense as these activities.

Circle the number that indicates how confident you are that you could be physically active in each of the following situations:

Scale

1 = not at all confident

2 = slightly confident

3 = moderately confident

4 = very confident

5 = extremely confident

1. When I am tired.

1 2 3 4 5

2. When I am in a bad mood.

1 2 3 4 5

3. When I feel I don't have time.

1 2 3 4 5

4. When I am on vacation.

1 2 3 4 5

5. When it is raining or snowing.

1 2 3 4 5

SF-36 QUESTIONNAIRE

1. In general, would you say your health is:

Excellent	Very good	Good	Fair	Poor
❑	❑	❑	❑	❑

2. Compared to one year ago, how would you rate your health in general now? (circle one)

Much better now than one year ago.

Somewhat better now than one year ago.

About the same as one year ago.

Somewhat worse than one year ago.

Much worse than one year ago.

3. The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much? (Mark each answer with an **X**)

ACTIVITIES	**Yes, Limited A Lot**	**Yes, Limited A Little**	**No, Not Limited At All**
a. **Vigorous activities,** such as running, lifting heavy objects, participating in strenuous sports			
b. **Moderate activities,** such as moving a table, pushing a vacuum cleaner, bowling, or playing golf			
c. Lifting or carrying groceries			
d. Climbing **several** flights of stairs			
e. Climbing **one** flight of stairs			
f. Bending, kneeling or stooping			
g. Walking **more than a mile**			
h. Walking **several blocks**			
i. Walking **one block**			
j. Bathing or dressing yourself			

4. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

	YES	NO
a. Cut down on the **amount of time** you spent on work or other activites		
b. **Accomplished less** than you would like		
c. Were limited in the **kind** of work or other activities		
d. Had **difficulty** performing the work or other activities (for example, it took extra effort)		

5. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

	YES	NO
a. Cut down the **amount of time** you spent on work or other activities		
b. **Accomplished less** than you would like		
c. Didn‘t do work or other activities as **carefully** as usual		

6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors or groups? (circle one)

Not at all **Slightly** **Moderately** **Quite a bit** **Extremely**

7. How much bodily pain have you had during the past 4 weeks? (circle one)

None **Very mild** **Mild** **Moderate** **Severe** **Very severe**

8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

Not at all **Slightly** **Moderately** **Quite a bit** **Extremely**

Please complete the following page of this form

9. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling.

How much of the time during the past 4 weeks: - (Mark each with an **X**)

	All of the Time	**Most of the Time**	**A Good Bit of the Time**	**Some of the Time**	**A Little of the Time**	**None of the Time**
a. Did you feel full of pep?						
b. Have you been a very nervous person?						
c. Have you felt so down in the dumps that nothing could cheer you up?						
d. Have you felt calm and peaceful?						
e. Did you have a lot of energy?						
f. Have you felt downhearted and blue?						
g. Did you feel worn out?						
h. Have you been a happy person?						
i. Did you feel tired?						

10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc.)? (circle one)

All of the time Most of the time Some of the time A little of the time None of the time

11. How TRUE or FALSE is each of the following statements for you?

	Definitely True	**Mostly True**	**Don‘t Know**	**Mostly False**	**Definitely False**
a. I seem to get sick a little easier than other people					
b. I am as healthy as anybody I know					
c. I expect my health to get worse					
d. My health is excellent					

MFI® MULTIDIMENSIONAL FATIGUE INVENTORY

® E. Smets, B.Garssen, B. Bonke.

Instructions:

By means of the following statements we would like to get an idea of how you have been feeling **lately**.

There is, for example, the statement: "I FEEL RELAXED"

If you think that this is **entirely true**, that indeed you have been feeling relaxed lately, please, place an **X** in the extreme left box; like this: **yes, that is true ☒1 ❑2 ❑3 ❑4 ❑5 no, that is not true**

The more you **disagree** with the statement, the more you can place an **X** in the direction of "no, that is not true". Please do not miss out a statement and place only one **X** in a box for each statement.

1	I feel fit.	**yes, that is true**	❑1	❑2	❑3	❑4	❑5	**no, that is not true**
2	Physically, I feel only able to do a little.	**yes, that is true**	❑1	❑2	❑3	❑4	❑5	**no, that is not true**
3	I feel very active.	**yes, that is true**	❑1	❑2	❑3	❑4	❑5	**no, that is not true**
4	I feel like doing all sorts of nice things.	**yes, that is true**	❑1	❑2	❑3	❑4	❑5	**no, that is not true**
5	I feel tired.	**yes, that is true**	❑1	❑2	❑3	❑4	❑5	**no, that is not true**
6	I think I do a lot in a day.	**yes, that is true**	❑1	❑2	❑3	❑4	❑5	**no, that is not true**
7	When I am doing something, I can keep my thoughts on it.	**yes, that is true**	❑1	❑2	❑3	❑4	❑5	**no, that is not true**
8	Physically I can take on a lot.	**yes, that is true**	❑1	❑2	❑3	❑4	❑5	**no, that is not true**
9	I dread having to do things.	**yes, that is true**	❑1	❑2	❑3	❑4	❑5	**no, that is not true**
10	I think I do very little in a day.	**yes, that is true**	❑1	❑2	❑3	❑4	❑5	**no, that is not true**
11	I can concentrate well.	**yes, that is true**	❑1	❑2	❑3	❑4	❑5	**no, that is not true**
12	I am rested.	**yes, that is true**	❑1	❑2	❑3	❑4	❑5	**no, that is not true**
13	It takes a lot of effort to concentrate on things.	**yes, that is true**	❑1	❑2	❑3	❑4	❑5	**no, that is not true**
14	Physically I feel I am in a bad condition.	**yes, that is true**	❑1	❑2	❑3	❑4	❑5	**no, that is not true**
15	I have a lot of plans.	**yes, that is true**	❑1	❑2	❑3	❑4	❑5	**no, that is not true**
16	I tire easily.	**yes, that is true**	❑1	❑2	❑3	❑4	❑5	**no, that is not true**
17	I get little done.	**yes, that is true**	❑1	❑2	❑3	❑4	❑5	**no, that is not true**
18	I don't feel like doing anything.	**yes, that is true**	❑1	❑2	❑3	❑4	❑5	**no, that is not true**
19	My thoughts easily wander.	**yes, that is true**	❑1	❑2	❑3	❑4	❑5	**no, that is not true**
20	Physically I feel I am in an excellent condition.	**yes, that is true**	❑1	❑2	❑3	❑4	❑5	**no, that is not true**

Pittsburgh Sleep Quality Index

Instructions: The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.

During the past month,

1. When have you usually gone to bed? _____
2. How long (in minutes) has it taken you to fall asleep each night? _____
3. When have you usually gotten up in the morning? _____
4. How many hours of actual sleep did you get that night? (This may be different than the number of hours you spend in bed) _____

5. During the past month, how often have you had trouble sleeping because you…	Not during the past month (0)	Less than once a week (1)	Once or twice a week (2)	Three or more times a week (3)
a. Cannot get to sleep within 30 minutes				
b. Wake up in the middle of the night or early morning				
c. Have to get up to use the bathroom				
d. Cannot breathe comfortably				
e. Cough or snore loudly				
f. Feel too cold				
g. Feel too hot				
h. Have bad dreams				
i. Have pain				
j. Other reason(s), please describe, including how often you have had trouble sleeping because of this reasons(s):				
6. During the past month, how often have you taken medicine (prescribed or "over the counter") to help you sleep?				
7. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?				
8. During the past month, how much of a problem has it been for you to keep up enthusiasm to get things done?				
	Very good (0)	Fairly good (1)	Fairly bad (2)	Very bad (3)
9. During the past month, how would you rate your sleep quality overall?				

STOP **STOP**

Research Personnel Only (below)

Component 1 #9 Score C1 ___

Component 2 #2 Score ([less than or equal to] 15min (0), 16-30 min (1), 31-60 min (2), >60 rain (3)) + #5a Score (if sum is equal 0-0; 1-2=1; 3-4=2; 5-6=3) C2 ___

Component 3 #4 Score (>7(0), 6-7(1), 5-6(2), <5 (3) C3 ___

Component 4 (total # of hours asleep)/(total # of hours in bed) x 100 >85%=0, 75%-84%=1, 65%-74%=2, <65%=3 C4 ___

Component 5 # sum of scores 5b to 5j (0=0; 1-9=1; 10-18=2; 19-27=3) C5 ___

Component 6 #6 Score C6 ___

Component 7 #7 score + #8 score (0=0; 1-2=1; 3-4=2; 5-6=3) C7 ___

Add the seven component scores together ____ = Global PSQI Score

Perceived Stress Scale

The following questions ask you about your feelings and thoughts over the last month. For each question, please circle how often you felt or thought a certain way. Please answer honestly and accurately. There is no right or wrong answer to each question.

Mark your answer by circling the appropriate number.

1. In the last month, how often have you been upset because of something that happened unexpectedly?

0	1	2	3	4
Never	Almost Never	Sometimes	Fairly Often	Very Often

2. In the last month, how often have you felt that you were unable to control the important things in your life?

0	1	2	3	4
Never	Almost Never	Sometimes	Fairly Often	Very Often

3. In the last month, how often have you felt nervous and "stressed"?

0	1	2	3	4
Never	Almost Never	Sometimes	Fairly Often	Very Often

4. In the last month, how often have you felt confident about your ability to handle your personal problems?

0	1	2	3	4
Never	Almost Never	Sometimes	Fairly Often	Very Often

5. In the last month, how often have you felt that things were going your way?

0	1	2	3	4
Never	Almost Never	Sometimes	Fairly Often	Very Often

6. In the last month, how often have you found that you could not cope with all the things that you had to do?

0	1	2	3	4

	Never	Almost Never	Sometimes	Fairly Often	Very Often

7. In the last month, how often have you been able to control irritations in your life?

0	1	2	3	4
Never	Almost Never	Sometimes	Fairly Often	Very Often

8. In the last month, how often have you felt that you were on top of things?

0	1	2	3	4
Never	Almost Never	Sometimes	Fairly Often	Very Often

9. In the last month, how often have you been angered because of things that were outside of your control?

0	1	2	3	4
Never	Almost Never	Sometimes	Fairly Often	Very Often

10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

0	1	2	3	4
Never	Almost Never	Sometimes	Fairly Often	Very Often

RATING ACTIVITIES OF DAILY LIVING

Using the scale below, please rate the extent to which you can successfully perform each activity.

Cannot Do			Moderate Difficulty			Can Do Easily
1	2	3	4	5	6	7

1. Reaching up over head

   1 2 3 4 5 6 7

2. Getting in and out of a car

   1 2 3 4 5 6 7

3. Walking on different surfaces

   1 2 3 4 5 6 7

4. Standing or being on feet for long periods of time

   1 2 3 4 5 6 7

5. Walking for about 2-3 blocks (1/4 mile)

   1 2 3 4 5 6 7

6. Getting down items from shelves

   1 2 3 4 5 6 7

7. Getting up and down from a chair

   1 2 3 4 5 6 7

8. Pick up and hold children

   1 2 3 4 5 6 7

Using the scale below, please rate the extent to which you can successfully perform each activity.

Cannot Do			Moderate Difficulty			Can Do Easily
1	2	3	4	5	6	7

9. Stooping, crouching or kneeling

1 2 3 4 5 6 7

10. Reaching out as if to shake someone's hand

1 2 3 4 5 6 7

11. Open jars, containers, etc.

1 2 3 4 5 6 7

12. Participate in physical recreation

1 2 3 4 5 6 7

13. Getting up and down from a bed

1 2 3 4 5 6 7

14. Reaching to floor to pick up items

1 2 3 4 5 6 7

15. Dress yourself without help

1 2 3 4 5 6 7

16. Pulling open drawer

1 2 3 4 5 6 7

Using the scale below, please rate the extent to which you can successfully perform each activity.

Cannot Do			Moderate Difficulty			Can Do Easily
1	2	3	4	5	6	7

17. Getting in and out of a tub

1 2 3 4 5 6 7

18. Bathe yourself

1 2 3 4 5 6 7

19. Carry items that weight more than five pounds

1 2 3 4 5 6 7

20. Getting up and down from a couch or recliner

1 2 3 4 5 6 7

Physical Activity Enjoyment Scale

Instructions: Please rate how you feel at the moment about the physical activity you have been doing.

1. I enjoy it.	1 2 3 4 5 6 7	I hate it.
2. I feel bored.	1 2 3 4 5 6 7	I feel interested.
3. I dislike it.	1 2 3 4 5 6 7	I like it.
4. I find it pleasurable.	1 2 3 4 5 6 7	I find it unpleasurable.
5. I am very absorbed in this activity.	1 2 3 4 5 6 7	I am not at all absorbed in this.
6. It's no fun at all.	1 2 3 4 5 6 7	It's a lot of fun.
7. I find it energizing.	1 2 3 4 5 6 7	I find it tiring.
8. It makes me depressed.	1 2 3 4 5 6 7	It makes me happy.
9. It's very pleasant.	1 2 3 4 5 6 7	It's very unpleasant.
10. I feel good physically while doing it.	1 2 3 4 5 6 7	I feel bad physically while doing it.
11. It's very invigorating.	1 2 3 4 5 6 7	It's not at all invigorating.
12. I am very frustrated by it.	1 2 3 4 5 6 7	I am not at all frustrated by it.
13. It's very gratifying.	1 2 3 4 5 6 7	It's not at all gratifying.
14. It's very exhilarating.	1 2 3 4 5 6 7	It's not at all exhilarating.
15. It's not at all stimulating.	1 2 3 4 5 6 7	It's very stimulating.
16. It gives me a strong sense of accomplishment.	1 2 3 4 5 6 7	It does not give me any sense of accomplishment.
17. It's very refreshing.	1 2 3 4 5 6 7	It's not at all refreshing.
18. I felt as thought I would rather be else I doing something else	1 2 3 4 5 6 7	I felt as though there was nothing would rather be doing.

Feeling Scale

While participating in exercise, it is common to experience changes in mood. Some individuals find exercise pleasurable, whereas others find it to be unpleasurable. Additionally, feelings may fluctuate across time. That is, one might feel good and bad a number of times during exercise. The following scale has been developed to measure such responses.

+5 VERY GOOD

+4

+3 GOOD

+ 2

+1 FAIRLY GOOD

0

-1 FAIRLY BAD

-2

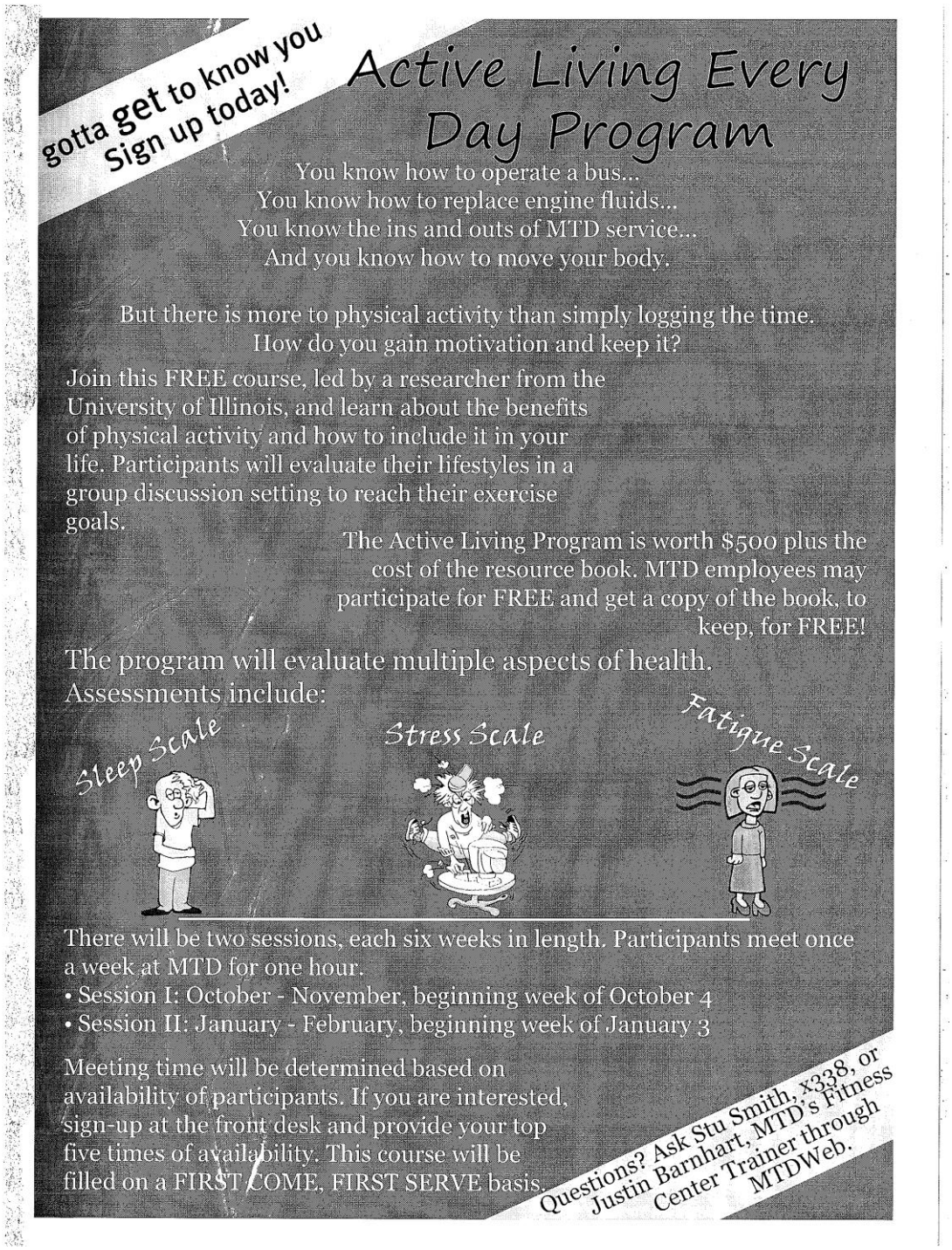
-3 BAD

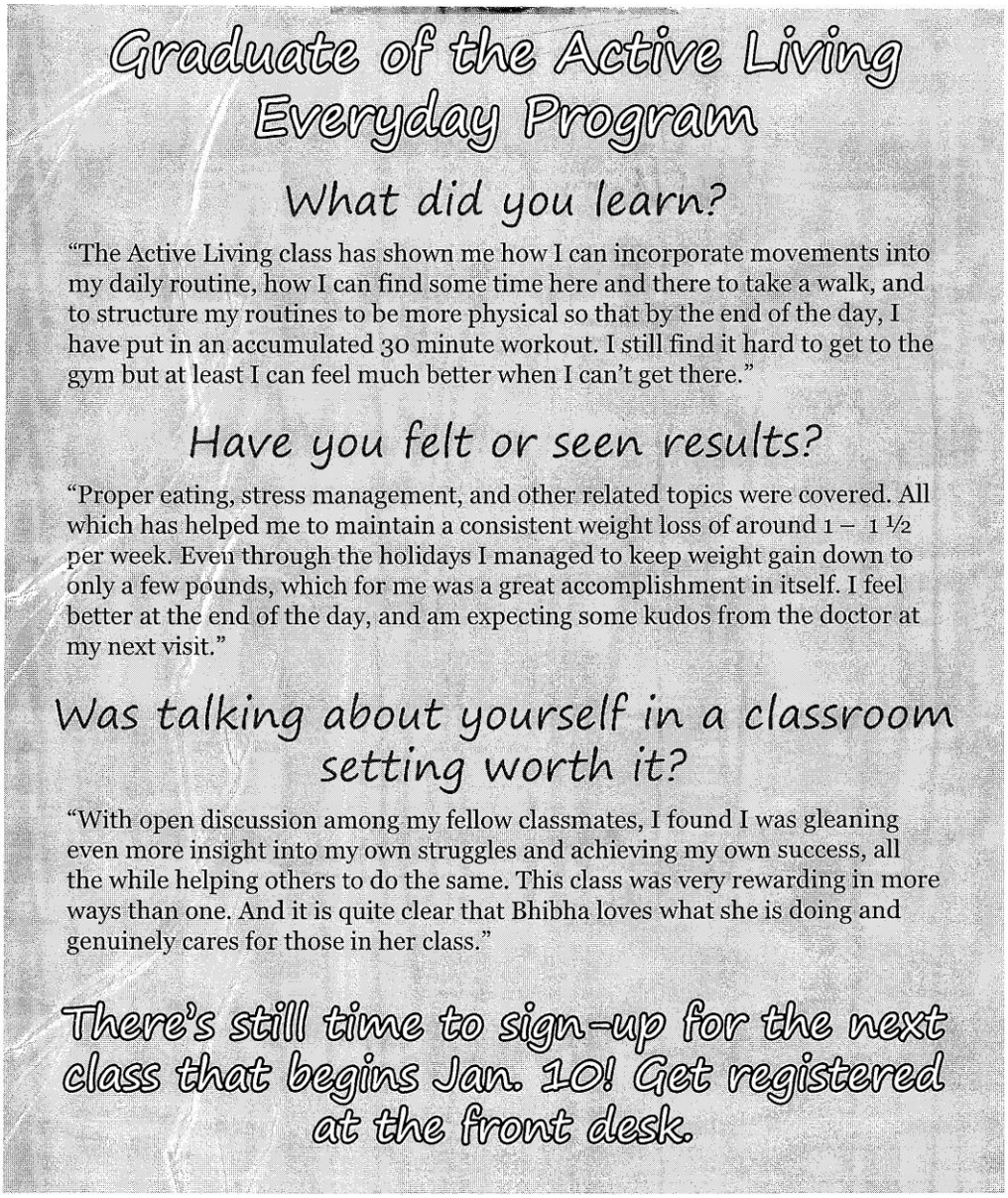
-4

-5 VERY BAD

APPENDIX B: RECRUITMENT MATERIALS

Recruitment Poster for Phase 1 and Phase 2





Graduate of the Active Living Everyday Program

What did you learn?

"The Active Living class has shown me how I can incorporate movements into my daily routine, how I can find some time here and there to take a walk, and to structure my routines to be more physical so that by the end of the day, I have put in an accumulated 30 minute workout. I still find it hard to get to the gym but at least I can feel much better when I can't get there."

Have you felt or seen results?

"Proper eating, stress management, and other related topics were covered. All which has helped me to maintain a consistent weight loss of around 1 – 1 ½ per week. Even through the holidays I managed to keep weight gain down to only a few pounds, which for me was a great accomplishment in itself. I feel better at the end of the day, and am expecting some kudos from the doctor at my next visit."

Was talking about yourself in a classroom setting worth it?

"With open discussion among my fellow classmates, I found I was gleaning even more insight into my own struggles and achieving my own success, all the while helping others to do the same. This class was very rewarding in more ways than one. And it is quite clear that Bhibha loves what she is doing and genuinely cares for those in her class."

There's still time to sign-up for the next class that begins Jan. 10! Get registered at the front desk.

CURRICULUM VITAE
BHIBHA M. DAS, PHD, MPH

3719 Summer Sage Court, Champaign, IL 61822 | 217-390-8156 | bhibha@gmail.com

EDUCATION

University of Illinois, Urbana, IL
Ph.D., Kinesiology **May 2011**

University of Illinois, Springfield, IL
Masters in Public Health, Health Promotion and Epidemiology **May 2005**

University of Illinois, Urbana, IL
Bachelor's of Science, Molecular and Integrative Physiology **May 2003**

AWARDS

Laura J. Huelster Award	**2011**
Nominated to List of Teachers Ranked as Excellent by Their Students	**2010**
Phi Kappa Phi Honor Society	**2009**
National Association of Chronic Disease Directors Scholarship	**2006**
Physical Activity and Public Health Practitioners' Course Fellow	**2006**
Graduation Marshall, University of Illinois, Springfield	**2005**
James Scholar, University of Illinois, Urbana	**1998**

RESEARCH & TEACHING EXPERIENCE

University of Illinois, Urbana, IL
Co-Instructor, Weight Management Coaching (Kines 494) **8/2010 – 12/2010**
Develop the syllabus, prepare all assignments and tests, develop and prepare special projects, grade assignments and tests, lead one lecture-discussion section, and meet with students upon request

University of Illinois, Urbana, IL
Teaching Assistant, Human Sexuality (Community Health 206) **6/2010 - 8/2010**
Prepare all assignments and tests, grade assignments and tests, lead one lecture-discussion section, and meet with students upon request

University of Illinois, Urbana, IL
Research Assistant , Dr. Ellen Evans **5/2010 - 5/2011**
Complete physical fitness testing on participants, analyze physical fitness testing results, assist in facilitation of physical activity and nutrition interventions, and oversee undergraduates working in lab

University of Illinois, Urbana, IL
Lifetime Fitness Program, Dr. Ellen Evans **5/2010 - 7/2010**
Oversee physical activity programs with adults, aged 55 years and over

University of Illinois, Urbana, IL
Teaching Assistant, Health Statistics (Community Health 244) **1/2010 - 5/2010**
Graded homework and tests, led two discussion sections, and met with students upon request

University of Illinois, Urbana, IL
Teaching Assistant, Intro. to PA Measurement & Evaluation (Kinesiology 401) **8/2009 – 12/2009**
Graded homework and tests, led lectures, and met with students upon request

University of Illinois, Urbana, IL
Research Assistant, Dr. Weimo Zhu **1/2009 – 5/2010**
Analyze physical activity data, create physical activity test items, prepare physical activity reports, work with industry leaders to develop physical activity tools, and oversee undergraduates working in lab

RELATED EXPERIENCE

Human Kinetics Publishers, Inc.
Active Living Partners (ALP) Program Manager **8/2007 – 1/2009**
Oversaw ALP program (Active Living Every Day and Healthy Eating Every Day), conducted all Webinar and in-person ALP trainings, consulted with ALP providers on how to successfully implement and evaluate ALP programs, provided direction and material for the ALP website, coordinated ALP monthly teleconferences, wrote ALP bi-monthly e-newsletters, wrote for the Y Life magazine, and promoted ALP programs to potential providers

Illinois Department of Public Health
Physical Activity Coordinator **2/2006 – 8/2007**
Coordinated with internal and external partners to promote physical activity initiatives throughout Illinois; served on numerous task forces including Illinois's Action for Healthy Kids, Chicago Area Transportation Study Task Force, and the Consortium to Lower Obesity in Chicago's Children; provided technical assistance and leadership in community-based interventions to promote physical activity; assessed gaps in current physical activity accessibility; wrote the physical activity portion of the Illinois State Plan to Prevent Overweight and Obesity; performed grant reviews; planned, designed, implemented, and evaluated physical activity interventions; designed and implemented worksite wellness initiatives for State of Illinois employees; trained as an Active Living Every Day and Coordinated Approach to Child Health facilitator; compiled and maintained the department's Physical Activity and Nutrition Listserv; and served as a faculty member for the Certificate Program in Geriatrics for Non-Physicians for the University of Illinois

Illinois Department of Public Health
Office of Women's Health (OWH) Intern **8/2004 – 8/2005**
Performed grant reviews, served as liaison between grantees and the OWH, assisted with the development of grant application guidelines and grant review process, aided in the planning and implementation of grant

preparation and training workshops, evaluated grantees' quarterly reports, revised grantee's budgets, monitored grantees' monthly reimbursements, participated in the Legislative Shadowing Program under State Representative Elaine Nekritz, engaged in cultural competence trainings, coordinated Wear Red Day events at the department, and helped in the planning of the Sixth Annual OWH Conference

GRANTS

NOT AWARDED

Health and Wellness Research Initiative, Exploring Physical Activity Barriers in University Faculty and Staff, $45,000

PUBLICATIONS

Das, B. M. (2009). Infectious diseases and sexually transmitted diseases. H. Gilly (Ed.). Health and Wellness for Life. Champaign, IL: Human Kinetics Publishers,.

Das, B. M. (2009). Wellness throughout life. H. Gilly (Ed.). Health and Wellness for Life. Champaign, IL: Human Kinetics Publishers.

ABSTRACTS & PROFESSIONAL PRESENTATIONS

International Society for Magnetic Resonance in Medicine Meeting **April 2011**
Quantification of Adipose Tissue Depots in the Thigh with Two-Point Dixon Imaging: Effect of Fitness Level on Adiposity in Elderly Women

International Society for Magnetic Resonance in Medicine Meeting **April 2011**
Quantification of Myocellular Lipids via 1H-MR Spectroscopy in Elderly Women: Effect of Adiposity and Physical Activity

International Society for Magnetic Resonance in Medicine Meeting **April 2011**
Using DTI to Assess the Effect of Obesity and Physical activity on Muscle Quality in Elderly Women

American Public Health Association (Washington, DC) **November 2011**
Project PEER: Peer education, Exercising and Eating Right.

American College Health Association National Conference (Philadelphia, PA) **June 2010**
Exploring Faculty and Staff Physical Activity Barriers at a Large University

Millikin University (Decatur, IL) **April 2010**
Wellness throughout the Lifetime

American Alliance for Health, Physical Education, Recreation, and Dance National Conference (Indianapolis, IN) **March 2010**
Why Healthy Kids are the Business of Businesses

American Alliance for Health, Physical Education, Recreation, and Dance National Conference (Indianapolis, IN) **March 2010**

Development of the Human Kinetics Knowledge Test

Millikin University (Decatur, IL) **November 2009**
Wellness throughout the Lifetime

2008 Illinois' Governor's Conference on Aging (Chicago, IL) **December 2008**
Active Living Every Day for People with Arthritis

Fourth Annual Northeast Regional Childhood Wellness Meeting (Wilkes-Barre, PA) **November 2008**
Evidence-Based Programs: Choose and Use What Works

University of Illinois, Springfield (Springfield, IL) **September 2008**
Health Education in Practice

Millikin University (Decatur, IL) **September 2008**
Wellness throughout the Lifetime

Illinois Department of Public Health (Springfield, IL) **June 2008**
Evidence-Based Interventions

University of Illinois, Springfield (Springfield, IL) **September 2007**
Health Education in Practice

2007 Illinois Rehabilitation Association Conference (Zion, IL) **May 2007**
Physical Activity for Individuals with Disabilities

Spring 2007 Certificate Program in Geriatrics for Non-Physicians (Fairview Heights, IL) **April 2007**
Engaging Aging Populations in Physical Activity

Third Annual Southern Illinois Physical Education and Health Conference (Carbondale, IL) **March 2007**
Importance in Physical Education in Promoting Physical Activity

2006 Illinois Intramural Recreation Sports Association Annual meeting (Chicago, IL) **October 2006**
Why Should College Students Care About Physical Activity?

Fall 2006 Certificate Program in Geriatrics for Non-Physicians (Galesburg, IL) **October 2006**
Engaging Aging Populations in Physical Activity

LANGUAGES

English – native language
Oriya – speak only

MEMBERSHIPS

2010-2011 University of Illinois Provost and Graduate College Student Advisory Board
American Alliance for Health, Physical Education, Recreation, and Dance
American Evaluation Association
American Public Health Association
Illinois Public Health Association
National Society of Physical Activity Practitioners in Public Health
Phi Kappa Phi Honor Society